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UME 27 NOVEMBER 14, 1938 NUMBER 23

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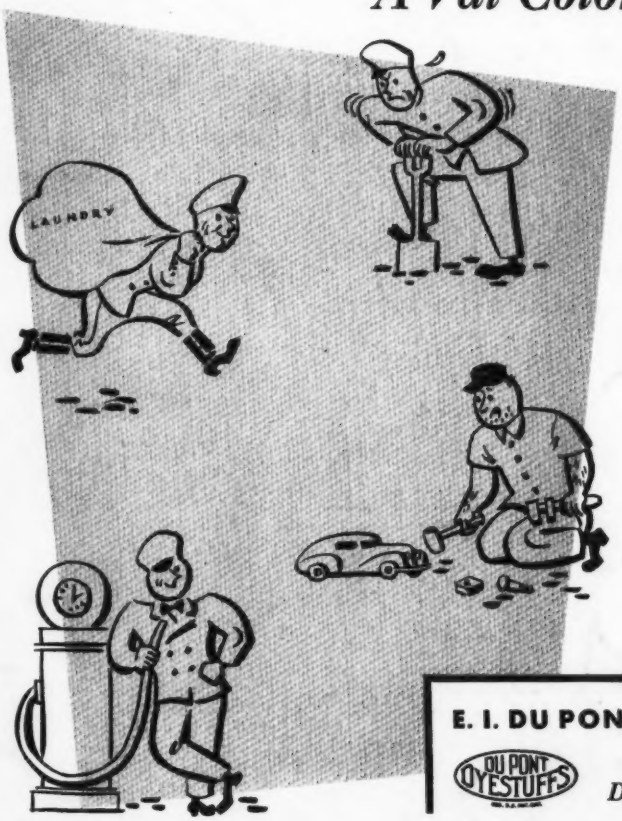

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AND THE NECESSARY MECHANICAL EQUIPMENT

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THE OBJECTS OF THIS ASSOCIATION ARE:

"To promote increase of knowledge of the application of dyes and chemicals in the Textile Industry.

"To encourage in any practicable way research work on chemical processes and materials of importance to the Textile Industry.

"To establish for the members channels by which the interchange of professional knowledge among them may be increased."

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AMERICAN
DYESTUFF REPORTER

VOLUME 27 NOVEMBER 14, 1938 NUMBER 23

Processing of Spun Rayon and Spun Rayon Mixtures*

WILLIAM H. CADY**

SPUN rayon fabrics should not be handled any more than is absolutely necessary, and every operation should have a definite purpose and should be planned with a full knowledge of the composition and structure of the cloth.

While the uses to which spun rayon is being put are constantly increasing, at the present time the principal fabrics in which this fiber predominates might be classified as follows: the challie, a lightweight, all-rayon dress material, usually printed; the shirting, similar in construction to the challie, but more closely woven, and usually containing either wool or acetate, which is frequently dyed in a contrasting color to the rayon; the shantung, an all-rayon dress fabric, characterized by thick and thin places in the yarn which produce the so-called linen effect; the gabardine, which may be composed of spun rayon alone or may contain wool or cotton as well; the hopsack, a closely woven sports fabric made of hard twisted yarn; the suiting, which frequently contains also wool and other fibers for special weaving and color effects; spun rayon and linen dress goods, containing both fibers in warp and filling alike; spun rayon and acetate dress goods of various weaves, and special mixtures of spun rayon and other fibers, mostly novelty fabrics, and consequently short lived.

Owing to the difference in construction of these various fabrics, there is no universal method of handling them through the finishing plant.

The first operation in the finishing plant is usually singeing. Fabrics composed of spun rayon and wool are singed as a rule, also any all-rayon cloth which is particularly hairy. On the other hand, challies and shantungs are customarily not singed. The final decision whether to singe or not to singe often depends upon the customer's requirements for finish. Gas singers are universally used.

All goods containing 10 per cent or more of wool, and spun rayon fabrics in general which tend to roll up along the selvages or contain bad creases, are usually crabbed at this stage, in order to set the fibers and equalize the tensions on the various threads, and make a smooth, flat fabric. There are several ways of crabbing, but for the average fabric it is sufficient merely to pass it through hot and then cold water in full width and roll it up for an hour or two. In special cases it may be preferred to crab on the jig, by giving two ends in water at 150° F. or higher, and leaving on the shell for several hours. The crabbing temperature should be higher than that of any subsequent operation if the full effect of the crabbing is to be retained.

If the cloth contains starch it is best to give it a suitable enzyme treatment; this sometimes follows the singeing, in the same manner as with cotton goods. A gelatine size is less difficult to remove and usually comes out during the boil-off, especially if the goods have been previously wet out and allowed to lie wet for some time. If necessary, a treatment at this stage with a proteolytic enzyme will eliminate the gelatine completely.

SELDOM MERCERIZED

Spun rayon fabrics are seldom mercerized, as the alkali swells the fibers excessively and in that condition they are unable to withstand the tension of the mercerizing frame. If the goods must be mercerized it is best to use caustic potash rather than soda and to wash out the alkali as quickly as possible with hot water.

Spun rayon fabrics containing no animal fibers are sometimes padded in the grey state with dilute cold caustic soda and allowed to lie for a few minutes without tension. This treatment swells the fibers and shrinks the threads, and often changes the entire character of the finished result. It is said to assist in loosening any impurities and aid in the subsequent scouring, and has been recommended for the production of imitation linen and wooly finishes. There is the disadvantage that fabrics treated with caustic are not penetrated as readily during the subsequent dyeing operation, probably because of the increased affinity for dyes which the caustic treatment gives to the rayon.

The boil-off, so-called, is for the purpose of removing all warp size, sighteners and other impurities and making the fabric as absorbent as possible for the dyeing or

*Abstracted from a Paper Delivered Before Committee D-13 of the American Society for Testing Materials, New York City, October 20, 1938.

**Chief Chemist of U. S. Finishing Co.

printing operations. Olive oil soap is largely used, sometimes with the addition of alkalies, such as soda ash or trisodium phosphate; ammonia is substituted when wool, silk or acetate is present. The temperature varies from 140°, when the fabric contains wool, to nearly the boiling point in the case of all-rayon. Strong alkalies should be avoided in the boil-off bath, and it is well to keep the degree of alkalinity nearly constant to ensure uniform dyeing later on. The soap, etc., should be completely washed out afterward. It is advisable not to let the cloth lie around wet for too long a time, as it may develop so-called "crush marks." Lightweight fabrics are usually impregnated with the boil-off liquor while in the open width, and are then converted into the rope form and scoured hot in the continuous machine. In some cases it is more convenient to do the scouring in the beck, just before dyeing.

Fabrics which must be kept at full width are scoured, somewhat superficially, in a continuous open soaper. Before dyeing on the jig, they may have to be framed if the selvages do not line up properly. Some of the heavier fabrics may be boiled off on the jig itself if the size they contain can be easily removed.

Fabrics which require bleaching (particularly those which contain linen) are next given a treatment in the jig or beck with sodium hypochlorite. If the goods contain also wool or silk, hydrogen peroxide made slightly alkaline with silicate of soda and heated to about 150° is substituted. Incidentally peroxide seems to give a little fuller hand than chemic.

DYEING OF FABRICS

The dyeing of spun rayon fabrics is a whole chapter in itself. It should be mentioned, parenthetically, that staple fiber dyes more uniformly than filament rayon, and many of the dyes which are taboo on taffetas, for example, because of their tendency to show warp streaks and filling bars, may be employed on spun rayon without difficulty. However, it is always desirable, so far as possible, to use dyes in combination which have nearly the same rate of exhaustion.

As already mentioned, the coloring is done either at full width in the jig or in rope form in the beck, according to the construction of the cloth. Rope dyeing is usually preferred (other things being equal), as there is less shading from end to end of the piece, and from side to side, and also better penetration. Furthermore, dyeing in the rope gives a fuller and "woolier" hand, while jig dyeing tends to stretch the cloth and give it a thinner feel, and may, in some cases, produce a moire effect. In case there is any doubt as to whether a particular fabric is better adapted for the jig or beck, it may be desirable to try first one method and then the other. If a certain construction which must be handled in open width is hard to penetrate when dyed in the jig, it is better first to pad the color on the dry cloth at 160°, with the addition of a little sulfonated castor oil or its equivalent, roll it up on a batching roll, transfer the roll to a jig and finish the dyeing there in a salt bath.

With regard to the dyeing apparatus itself, all surfaces with which the cloth is in contact must be smooth. Becks are best constructed of monel metal or stainless steel and should be so designed as to minimize tension and friction. Jigs should also be as tensionless as possible, in order to prevent undue stretching of the fabric.

For light shades, direct dyes are usually employed on all types of fabrics. Dark shades may require developed colors, or those which are aftertreated with formaldehyde. Other classes of dyes, such as vats and naphthols, are rarely used, and only where the fastness requirements make them necessary. When dyeing in the beck (this applies to hopsacks, shantungs, shirtings, gabardines, light and medium dress goods and light suitings), the cloth is first run for a few minutes at 120° with a little sulfonated oil or alcohol, the dye solution is added, and the temperature gradually raised to 180°, after which the salt or Glauber's salt is fed on, not too rapidly. Some dyers favor a rather low temperature for the dye bath, in order to secure even dyeing, and this may perhaps be necessary for very light shades, but for full navies, wines, etc., the writer prefers the maximum heat which can be obtained, as this will give the best color value.

MIXTURE FABRICS

When more than one fiber is present in the fabric, the dyeing is naturally more complicated. Combinations of spun rayon and wool, if they are intended for solid colors, are ordinarily dyed with direct dyes, supplemented by neutral dyeing wool dyes. In this case, the two fibers take the dyes simultaneously, at about 190° F. Developed colors can usually be applied in a similar manner.

If the wool is to be left white, selected dyes must be used on the rayon, and the bath must be made alkaline with ammonia, so as not to tint the wool; and the temperature is kept at 140° or less. An addition of Katanol or similar product may be beneficial if the dye persists in staining the wool. If, on the other hand, the fabric is to be cross-dyed in two contrasting colors, it is best to dye the wool first at the boil with selected acid dyes which exhaust well in a formic acid bath and do not tint the rayon excessively. Black and other dark shades on the wool will probably be dyed with top-chromed colors on account of their superior fastness. The rayon is then dyed with direct dyes in a fresh bath at a lower temperature, with a little ammonia added to neutralize any residual acid.

Combinations of spun rayon and acetate are treated in much the same manner. Solid shades are dyed in a bath containing both direct and acetate dyes, with a suitable dispersing agent for the latter and salt or Glauber's salt for the former. The temperature is usually 120° at the start and is raised to 175°. Here also selected dyes must be used which dye only the rayon or the acetate, leaving the other fiber white or nearly so. The reason for this is that any stain produced by the acetate dye on the rayon, or vice versa, is usually very fugitive and is likely to fade badly at some later time. If one of the fibers

is to be left white, even more care must be used in selecting the dyes.

If the two fibers are to be colored in different shades, it is best to dye the darker shade first (if it is not feasible to dye both simultaneously). Thus, the rayon may be dyed first with developed colors, and the acetate tinted later. It is not possible to lay down set rules for this kind of work, as so much depends on the shades required and the available dyes for each shade.

Combinations of spun rayon and silk are treated in much the same manner as rayon and wool, except that it is not feasible to keep the rayon dyes from staining the silk by simply lowering the temperature. Here again success is only obtained by a careful selection of dyes.

Occasionally three-color effects are called for, as, for example, a gold on acetate, a red on wool and a light blue on rayon. This kind of work is quite difficult and not to be encouraged, but it is possible to produce a few good combinations if one has the patience to hunt for the particular dyes which have the necessary affinities. Here is a good opportunity for ingenuity on the part of the dye chemist, but the dyer must expect a few headaches. What makes the work especially difficult is the fact that most acetate dyes also stain wool, and most acid wool dyes also stain acetate. Probably the best way to dye full shades on acetate without staining the wool or the rayon excessively is by using the acetate developed dyes, and particularly the organic bases, like alphanaphthylamine, and then diazotizing and developing with Beta Oxy Naphthoic Acid or Resorcin. In this way the wool is little stained, except by the nitrous acid, which tends to yellow it somewhat, and it can then be dyed in a formic acid bath with selected acid dyes (there are a few) which do not stain acetate too much. The rayon can be dyed later with selected direct dyes.

METHODS OF PRINTING

The printing of spun rayon is not confined to any particular fabric, though it is perhaps more frequently done on challies. Vat colors, Rapidogens and Indigosols are the rule, the old-fashioned undispersed vats being generally preferred because they appear to give better color value than the dispersed type. For thickenings, too much starch is to be avoided, as it levels poorly and does not wash out easily. On the other hand, too much British gum will give poor color value. A mixture of starch, British gum and tragacanth or other natural gum is usually satisfactory. On the whole, spun rayon printing differs little from filament rayon printing.

The drying of spun rayon fabrics must be done carefully and with due regard to the construction of the cloth. To remove the surplus water, all fabrics which are dyed in open width, and even some which are dyed in the rope, must be vacuum extracted if creases are to be avoided. The lightest constructions may be handled in a rotary extractor. As to the actual drying, light weight fabrics are best run through the net or loop drier, followed by short framing. Suitings and other heavy goods are usually dried on the long frame, but sometimes on cans. The latter method is not so satisfactory, as it may tend to stretch the cloth warpwise and impart an unpleasant sheen and undesirable hand to the cloth. All fabrics should be dried as quickly as possible after dyeing, to avoid cloudiness and "crows' feet" (in the case of rope dyeing) or moire effects (in the case of jig dyeing). Direct dyes are particularly susceptible to these troubles.

Spun rayon fabrics, as a rule, require little in the way of finishing materials. A small amount of softener, such as sulfonated olive oil or one of the sulfated fatty alcohols, is usually sufficient, although occasionally a little gum is added to impart firmness. These materials are usually applied in the quetsch, followed by drying in the net or loop drier, and short framing. Waterproofing compounds, usually of the aluminum stearate type, are similarly applied.

If a very smooth, tailored effect is desired, such as is produced by a Hoffman press, it is customary to decatize the goods after dyeing. This may be accomplished by wrapping them around a perforated pipe between layers of cotton or wool blanket and passing steam through the pipe for two or three minutes; then applying a vacuum to remove all water of condensation.

A passage through the so-called silk calender will increase the softness of most spun rayon fabrics, but this operation should be avoided on nub cloth and fancy weaves, or any fabrics where maximum fullness is desired.

SPECIAL FINISHES

Sometimes special finishes are required, such as the so-called "anti-crease" process, with which almost everyone is familiar. For this purpose, synthetic resins, particularly those made from urea and formaldehyde, are usually employed. They are applied in water solution, preferably on the quetsch, after which the goods are net dried and "cured" at a somewhat elevated temperature, to render the resin insoluble. The temperature of the "curing" varies from 260° to 340° F., according to the particular resin used, the type of catalyst which is added, and the length of time during which the heat is maintained. Various machines are used for "curing," such as electrically heated cans, tenter frames and crepe driers. A moist heat is preferable to a dry heat, as the latter may injure the fiber. After "curing," the fabric must be thoroughly washed to remove excess resin and any traces of acid; otherwise, there is danger that while the goods are in storage, unpleasant odors may develop, which will not promote consumer satisfaction.

Synthetic resins are also used for other finishes besides "anti-crease," for example, to give a firmer and fuller "hand" to lessen the tendency of the garment to shrink and stretch, and to enable it to keep its shape better when worn. Also, the tensile strength of spun rayon when wet is increased by this resin treatment.

Since fabrics which have been treated with resins may not be further dyed, it is necessary to employ in the original dye bath only such colors as will not change shade or lose depth. This necessitates a careful selection of dyes, particularly direct dyes, as some of these are much altered by this treatment. By way of compensation, the fastness

to washing of dyed fabrics when "anti-creased" is usually somewhat improved.

It may not be generally known that the urea-formaldehyde resins occasionally have a marked effect on the light fastness of dyes. For example, many direct dyes, particularly blues and greens, become much more sensitive to light after the "anti-crease" treatment. On the other hand, some dyes are even improved a little in light fastness by this process. So far as the writer is aware, no fundamental study has yet been made of these phenomena, and it is still necessary for the mill chemist to test every dye individually and satisfy himself as to the light fastness before recommending it to the dyer for fabrics to be "anti-creased." It is suggested that the dye firms could render a considerable service to the finishing industry by publishing some comprehensive data along this line.

Physical and Chemical

Textile Testing-XII

JOHN H. SKINKLE*

PART II—CHEMICAL TESTING

(Continued from September 5, 1938 issue)

Chapter 12—Fiber Mixtures

QUALITATIVE ANALYSIS

THE identification of fibers by purely chemical means is so complex as to be almost an impossibility, although in a great many cases a strong degree of probability may be established. The principal difficulties to which this uncertainty is due are:

1. Many times a test indicates a group of fibers rather than a single fiber; for example, a chemical test might show that a certain fiber was an animal hair but there would be no chemical method of determining which hair.

2. Finishing materials may affect the tests and give false results; for example, gelatine will give the same test as animal fibers and starch may give the same test as swollen cellulose fibers.

3. Dyes interfere with most of the color reactions and even the trace of dye left after stripping may do the same; for example, the test for nitro rayon is a test for traces of nitro groups, which are present in many dyes.

4. If a solubility test is used, a small amount of one constituent of a mixture may be dissolved with no noticeable effect; for example, if a mixture was 5 per cent silk and 95 per cent wool, the silk might be dissolved in concentrated hydrochloric acid with no noticeable change in the mixture.

5. Degraded or modified fibers may give the reactions of another fiber; for example, a wool shoddy containing a small amount of carbonized cotton might completely dissolve in 5 per cent potassium hydroxide.

6. New fibers are continually being introduced which have some properties of older fibers; for example, Lanital gives most of the reactions of wool and would not normally be differentiated from it in a chemical test.

In view of the above, the only safe way to analyze a mixture of fibers is by using the microscope in conjunction with the tests to be described and to confirm every reaction by other reactions or by the microscope.

The tests usually carried out may be classified as follows:

1. Burning tests.
2. Color tests.
3. Solubility tests.

These will be discussed in more detail.

4. Dyeing or staining tests—these are too uncertain because they are too likely to be affected by traces of impurities and slight variations in the method of procedure.

5. Microscopic examination—this will be omitted for now and will be taken up in another section.

Since we are to attempt to identify the fibers by chemical means, we should classify the fibers according to chemical composition:

A. Mineral fibers—asbestos, glass

B. Cellulose derivatives
   1. Lignocellulose—kapok, jute, hemp
   2. Cellulose—cotton, flax, ramie
   3. Swollen cellulose—mercerized cotton, rayons
   4. Cellulose ester—acetate rayon

C. Protein fibers
   1. Protein and mineral matter—weighted silk
   2. Silks—true silk, tussah
   3. Casein derivatives—Lanital
   4. Hairs—wool, mohair, camel hair, etc.

The simplest and the first test to be applied is the burning test. This is carried out by pulling out single fibers and applying a flame to the end; if the fiber is not burned it indicates a mineral fiber; an odor of burned feathers or hair with the formation of a knob on the end indicates a protein fiber; an odor of burning feathers but with the ash retaining the original shape indicates weighted silk; an aromatic odor with melting and formation of a knob indicates acetate rayon; little or no odor and a shapeless ash which falls off indicates a cellulose fiber. This test then, shows definitely whether the fiber is a mineral fiber

*Lowell Textile Institute.

or a weighted silk; it also gives a strong indication of whether it is an animal or vegetable fiber or acetate rayon.

The next step, if the fiber is not mineral or weighted silk, is to determine whether the fiber is animal or vegetable. If the material is not dyed, Millon's reagent (see Chapter 11) may be used; fibers are placed on a watch glass with a drop or two of Millon's reagent and the watch glass is warmed; protein fibers turn red, cellulose fibers remain uncolored. If the material is dyed, it is boiled for 5 to 10 minutes in 5 per cent potassium hydroxide; protein fibers dissolve, cellulose fibers remain undissolved.

If the fiber is found to be protein, another sample is treated with cold concentrated hydrochloric acid for 15 to 20 minutes; the hairs and Lanital do not dissolve; the silks dissolve, true silk very rapidly and tussah silk more slowly. If the fiber is now determined as a hair or Lanital, it may be dissolved in sodium or potassium hydroxide and lead acetate added; a black color indicates an animal hair, Lanital contains so little sulfur that it gives no coloration.

If the fiber is found to be a cellulose derivative, a sample is treated with warm acetone for 10 to 15 minutes; if it dissolves it is cellulose acetate (which would have been indicated by the burning test); if it is insoluble it is one of the other cellulose derivatives. Another sample is then stripped of dye, if necessary, and is then tested for swollen cellulose by the zinc chloride-iodine test. The solution and test is as follows: Solution A is 280 grams of zinc chloride in 300 cc. of water; Solution B is 1 gram of iodine and 20 grams of potassium iodide in 100 cc. of water. The reagent is prepared by adding 6 drops (0.2 cc.) of Solution B to 20 cc. of Solution A. The previously wet-out and squeezed sample is immersed in the mixture at room temperature for 3 minutes and is then removed and rinsed; unswollen cellulose is decolorized almost immediately, swollen cellulose remains a dark blue for some time, but eventually becomes decolorized.

If the sample is undyed and is a cellulose derivative but neither swollen nor cellulose acetate, it may be tested for lignocellulose by immersing a few fibers on a watch glass in 2 per cent aniline sulfate solution at room temperature; lignocelluloses turn yellow, cellulose fibers are not colored.

Table XV gives a summary of the tests made so far and shows that we have identified the mineral fibers, weighted silk, Lanital, and acetate rayon. There now remains the following groups to be broken down by further tests:

1. Silks—true silk, tussah.
2. Hairs—wool, mohair, etc.

TABLE XV

Qualitative Analysis of Fibers

(Assuming that mineral fibers and weighted silk have already been recognized by the burning test)
Test with Millon's reagent or 5 per cent KOH

<table>
<tr><td colspan="3">Red color (Millon's) or Soluble (KOH)
PROTEIN FIBERS
Test with HCl</td><td colspan="4">No coloration (Millon's) or Insoluble (KOH)
CELLULOSE DERIVATIVES
Test with acetone</td></tr>
<tr><td>Soluble
SILKS</td><td colspan="2">Insoluble
HAIRS, LANITAL
Dissolve in KOH or NaOH, add $PbAc_2$</td><td>Soluble
ACETATE RAYON</td><td colspan="3">Insoluble
CELLULOSE, LIGNOCELLULOSE
SWOLLEN CELLULOSE
Strip off dye, test with $ZnCl_2$-I_2</td></tr>
<tr><td></td><td>Black
HAIRS</td><td>No color
LANITAL</td><td></td><td>Blue
SWOLLEN CELLULOSE</td><td colspan="2">Uncolored
CELLULOSE, LIGNOCELLULOSE
If undyed, test with aniline sulfate</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>Yellow
LIGNO-CELLULOSE</td><td>Uncolored
CELLULOSE</td></tr>
</table>

3. Swollen cellulose—mercerized cotton, viscose rayon, cupra rayon, nitro rayon.

4. Lignocellulose—kapok, jute, hemp.

5. Cellulose—cotton, flax, ramie.

At this time, the microscope should be used, but if one is not available the following tests may be employed.

The silks, if undyed, may be differentiated by color; tussah silk is a brown color, while degummed true silk is white. If the fiber is dyed or undyed a fair idea may be obtained from its behavior in cold concentrated hydrochloric acid; silk dissolves rapidly, tussah much more slowly. In the same way, boiling 1 per cent sodium hydroxide dissolves true silk very rapidly whereas tussah silk requires at least 30 minutes to dissolve.

The hairs cannot be differentiated by any chemical tests. If undyed, camel hair can be distinguished from wool by its brown color and an expert can often distinguish one hair from another by the appearance. The new fiber, Lanital (or Casein Wool), is used in mixtures with wool and may be distinguished in the mixture by its greater affinity for Methylene Blue: immerse the sample for a few minutes in 10 per cent sodium hydroxide at room temperature, wash, immerse in cold 1 per cent Methylene Blue for 5 to 10 minutes, wash thoroughly; Lanital is stained blue, wool is not colored or is only slightly colored. Whittaker's dyeing test may be used on dyed or undyed wool-Lanital blends: immerse one minute in a cold solution of 0.5 grams of Xylene Light Yellow 2G, Azo Geranine 2GS, or Erio Fast Cyanine S and 0.5 cc. of 80 per cent sulfuric acid per 100 cc. of water and then rinse; the Lanital is dyed a full shade while the wool is only slightly stained. If the mixture is dyed, one of the above dyes having a contrasting color should be used.

Of the swollen celluloses, three are rayons and the other is mercerized cotton; if the specimen is continuous filament, of course, it is one of the rayons. The lustrous appearance of the rayons, also, is usually enough to distinguish it from the mercerized cotton. If undyed, nitro rayon (now practically never found) may be distinguished by the use of diphenylamine reagent: 1 gram of diphenylamine dissolved in a mixture of 33 grams glacial acetic acid and 66 grams of concentrated sulfuric acid; a sample of the unknown on a watch glass is moistened with the reagent, nitro rayon is colored blue while other fibers are uncolored. The differentiation of cupra and viscose rayons by any other means than the microscope is uncertain but the two following may be tried. Wilson's method consists of treating about 0.2 gram of sample with 10 cc. of concentrated sulfuric acid in a test tube; both cupra and viscose dissolve, cupra with a yellow or brownish color immediately and a brownish yellow after 40 minutes, viscose with a reddish-brown color which is a rusty brown after 40 minutes. The sulfide test of the A.S.T.M. may also be used: 5 grams of sample are placed in a 250 cc. conical flask together with 100 cc. of water and 3 cc. of concentrated sulfuric acid; the mouth of the flask is covered with a piece of lead acetate paper and the flask is allowed to stand at 90 to 95° C. for 4 hours; viscose stains the paper yellowish to brown or possibly black, cupra does not stain the paper.

Of the lignocelluloses, kapok is never found in the form of yarn or cloth but only in bulk, it may be recognized by the silky feel, the resistance to wetting by water, and by its relatively short staple. By immersion in chlorine water for one minute, spreading on a white porcelain dish, and the addition of several drops of ammonia solution jute and kapok are given a red or violet color while hemp is given at most a brown color.

The cellulose fibers (cotton, flax, and ramie) cannot be chemically differentiated. The staple of the cotton is usually much shorter than either flax or ramie. The A.S.T.M. method of distinguishing cotton from linen consists in drawing out a fiber and moistening the end of the fiber between the thumb and finger; if the fiber tip curls clockwise it is linen; if counterclockwise it is cotton. Ramie is usually somewhat stiffer than either cotton or linen. For complete verification of the identity, the microscope should be used.

The continual introduction of new synthetic fibers should be borne in mind and the above tests must be modified whenever necessary. It must be emphasized again that for a definite and certain knowledge of what fibers are present, especially in a rather complex mixture, the microscope must be used.

References:

(1) Matthews, J. M. Textile Fibers. John Wiley & Sons, Inc., New York. 1924.

(2) Trotman, S. R. and Trotman, E. R. Textile Analysis. J. B. Lippencott Co., Philadelphia. 1932.

(3) A.S.T.M. Standards on Textile Materials. A.S.T.M., Philadelphia. 1937.

(4) Schio, D. Lanital Fiber: Identification and Determination. Rusta *12,* 157 (1937).

(5) Whittaker, C. Test to Distinguish Between Wool and Casein Fiber. Journal of the Society of Dyers and Colourists *53,* 468 (1937).

(6) Von Bergen, W. Casein Wool. American Dyestuff Reporter *25,* 146 (1936).

QUANTITATIVE ANALYSIS

The quantitative methods for analyzing mixtures of fibers may be grouped into the following four cases:

1. Mechanical analysis—picking out all of one fiber from the mixture of two or more fibers and weighing all of each fiber separately; an example would be when the warp threads were cotton and the filling threads wool, in this case each set of yarns may be weighed and its percentage calculated. This method is not applicable to blends of fibers, however.

2. Microscopic analysis—counting the number of each kind of fiber in a mixture. To be accurate, the number of fibers should be multiplied by their average weight to get the percentage by weight. This method therefore gives only approximate results and is used only in cases where no other method is available; an example of a case where this method would be used is in the case of a wool-mohair blend. ***(Continued on page 657)***

PROCEEDINGS OF THE

American Association of Textile Chemists and Colorists

NOVEMBER 14, 1938

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North Carolina State College Student Section
W. L. Carter, Chairman; Seymour Schandler, Secretary.

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Newton Monschein, Chairman; Bernard Menin, Secretary.

Members should notify the **Secretary** immediately of all address changes

Communication Re

Eighteenth Annual Meeting

Atlanta, Ga.
November 2, 1938.

Dear Member:

Once more I wish to extend through the AMERICAN DYESTUFF REPORTER a cordial welcome to all A.A.T.C.C. members to the national convention at the Atlanta Biltmore in Atlanta, Friday and Saturday, December 2 and 3. We are looking forward to having a fine crowd with us, and have about completed our plans. I imagine the tentative program will be printed on another page, but would appreciate making here some suggestions for, and requests of, those who plan to come.

Reservations for Hotel Rooms. Our committee is handling *all* hotel reservations, and it will simplify matters if those who have not done so will write or wire immediately to George H. Small, chairman, Reservation and Registration Committee, indicating the accommodations desired, with names of all people in a party. It will also help if those who are coming will return to A. Kempton Haynes the card enclosed with Dr. Chapin's letter of November 1.

Time of Arrival in Atlanta. We urge everyone to reach Atlanta not later than Friday morning, December 2. The first general function of the convention is the luncheon at 1:00 P. M., at which Governor E. D. Rivers of Georgia,

and Hugh M. Comer of Avondale Mills will speak. There will be, simultaneously, a separate luncheon for the visiting ladies at this time. Those from the North and East who are coming down on Southern train No. 38, are urged to disembark at the Peachtree Station at 8:20 A. M. (Atlanta time). Just tell the porter you want to get off at Peachtree Station, and we'll be there to meet you.

By All Means—Bring the Ladies. We do want to encourage the men, in every possible case, to bring their wives. Our ladies' committee is looking for them for the special ladies' luncheon and party on Friday. From that point on, we want the ladies to participate in (1) the informal supper on Friday evening; (2) the sight-seeing tour of Atlanta Saturday afternoon; and (3) the banquet on Saturday evening and the dance to follow. The ladies will be welcome at these functions and we have tried to arrange programs for them that the ladies will enjoy.

Attention, Golfers. We have made arrangements for a golf tournament for Saturday afternoon, for those desiring to play, at East Lake Country Club, the home course of Bobby Jones and Charlie Yates, with a special greens fee of $1.00. We have some attractive prizes for the golfers, to be awarded at the banquet Saturday night by, we hope, either Bobby Jones or Charlie Yates. Bring your golf clubs (and a sweater, for Atlanta isn't tropical), and when you get here, look up Russell Gill at the special golfers' registration desk and let him help you make your arrangements. We will have arrangements made also at Brookhaven Country Club for those who prefer to play there.

Sight-seeing Trip, Saturday Afternoon. Our entertainment committee has laid out a sight-seeing tour for Saturday afternoon which we feel will be highly interesting, and well worth while, especially for those who have never been to Atlanta before. We hope you will participate.

Radio Program About Convention, November 24. At 10:30 P. M. (Central Standard Time), 11:30 P. M. (Eastern Standard Time) on Thursday evening, November 24, we will put on a radio program concerning the convention on Station WSB, Atlanta (740 kilocycles). It will last a half-hour. This will be Thanksgiving night, and if you are not otherwise engaged at the time, we shall appreciate your listening in.

Exhibit of Textile Products. We are arranging an attractive and extensive exhibit of textile products from southern textile mills, to be located in the hotel ball room. We think it will show our visitors something of the variety and quality of textile goods made in the South. Be sure to keep it in mind, and we will tell you more about certain southern textile products when you get here.

To Recapitulate. Keep the following schedule in mind: Friday, 1:00 P. M., Luncheon for all delegates, with Governor Rivers and Hugh Comer speaking (simultaneously lunch, followed by bridge party, for the ladies at 2:30 P. M.). First technical session and business meeting, 7:00 P. M.; informal supper, to which the ladies are urged to come, with entertainment of a distinctly southern character, and informal dancing later.

Saturday: 9:30 A. M., Second and concluding technical session. 2:00 P. M., organized sight-seeing tour, and golf for those who desire it. 6:15 P. M., reception at Atlanta Athletic Club, preceding annual banquet at 7:00 P. M., also at Atlanta Athletic Club. (We hope everyone will get to the club from their hotels as near 6:15 P. M. as possible. There will be available there all facilities for socializing, and a cocktail trio to entertain you prior to the banquet.)

Again, we bid you welcome. We have tried to plan a comfortable and enjoyable program for you, without in any way detracting from the high purpose and technical programs of the association. *Do* come, and give us the pleasure of having you with us.

Sincerely yours,

CONVENTION COMMITTEE, SOUTHEASTERN SECTION,
By ROBERT W. PHILIP.

Special Round Trip Fare To Atlanta

BEFORE canceling fifteen-day round trip rates generally in September, the Southern Railway System made a special extension to cover the Annual Meeting of the Association in Atlanta. Tickets will be sold at ticket offices in New York and southward, to those stating that they are attending the Annual Meeting. In New England they must be purchased directly from the Southern Railway System, 185 Devonshire St., Boston. They will be on sale from November 28 to December 2, inclusive, bearing final limit for return fifteen days from date of sale, and permitting stop-overs at all points.

The reduction applies between Washington and Atlanta, making round trip fares as follows:—

Boston, $57.75; Providence, $55.15; New York, $42.15; Philadelphia, $36.75; Washington, $28.75. A lower berth, one way, from New York is $6.85; from Washington, $5.25.

Following are train times, Central Standard for Atlanta, and Eastern Standard for other points:—

Leave Boston	10:35 PM	9:00 AM	12:00 M	4:00 PM
Leave New York, Penn Sta.	9:30 AM	2:25 PM	7:30 PM	9:45 PM
Arrive Washington.	1:25 PM	6:25 PM	11:40 PM	2:10 AM
Leave Washington .	1:40 PM	6:45 PM	11:59 PM	3:00 AM
Arrive Atlanta	6:00 AM	8:35 AM	3:30 PM	5:40 PM
Leave Atlanta	11:55 PM	8:25 AM	1:00 PM	6:10 PM
Arrive Washington.	7:25 PM	1:40 AM	4:50 AM	11:20 AM
Leave Washington .	8:00 PM	2:10 AM	5:05 AM	12:00 M
Arrive New York..	12:15 AM	6:55 AM	9:15 AM	4:00 PM
Arrive Boston	7:45 AM	3:00 PM	3:00 PM	10:00 PM

Eighteenth Annual Meeting

Tentative Program

FRIDAY, DECEMBER 2

10:00 A.M.—Registration Opens in north Foyer of Atlanta Biltmore Hotel.

10:00 A.M.—One hundred and twentieth Council Meeting.

11:00 A.M.—One hundred and thirteenth Meeting of Research Committee.

12:30 P.M.—Luncheon in Georgian Ball Room for all Members.

Official Opening of the Convention.

Presiding: ALLEN JONES, *Vice-Chairman of Southeastern Section.*

Speakers:

HON. THEO. M. FORBES, *Executive Secretary, Cotton Manufacturers' Association of Georgia.*

HON. E. D. RIVERS, *Governor of Georgia.*

HUGH M. COMER, *Vice-President and General Manager of Avondale Mills*: "A Mill Executive's Viewpoint on Dyeing and Finishing."

Music by School Band from Avondale Mills.

12:30 P.M.—Complimentary Luncheon for Visiting Ladies, followed by Bridge and other Entertainment.

2:30 P.M.—First Technical Session in Pompeian Room.

5:00 P.M.—ANNUAL BUSINESS MEETING.

7:00 P.M.—Buffet Supper for Members and Visiting Ladies in Georgian Ball Room.

Presiding: PAUL G. WEAR, *Chairman of Entertainment Committee.*

Moving Picture: "Destiny of Dixie."

Entertainment staged by Graham Jackson, and followed by Dancing.

SATURDAY, DECEMBER 3

9:30 A.M.—Concluding Technical Session.

12:30 P.M.—End of Technical Program.

12:45 P.M.—Luncheon for Sectional Officers Only.

2:00 P.M.—Complimentary Sight-seeing Trips to Cyclorama and Federal Penitentiary.

2:00 P.M.—Golf Tournament with Prizes.

6:15 P.M.—Reception at Atlanta Athletic Club. Free Bus Service.

7:00 P.M.—BANQUET at Atlanta Athletic Club, followed by Dancing (Dress Optional).

Toastmaster: ROBERT W. PHILIP, *Chairman of Southeastern Section.*

Speakers:

ALBAN EAVENSON, *President of the Association.*

PROFESSOR LOUIS A. OLNEY, *President Emeritus and Chairman of the Research Committee of the Association.*

Music by Glee Club of Georgia School of Technology.

Tentative Technical Program

ROBERT H. ADAMS
Consultant for Callaway Mills
"The Testing of Textile Fabrics"

HENRY L. YOUNG
Aridye Corp.
"Some Fundamental Differences in Printing with Pigments"

RALPH D. GREENE
Calco Chemical Company
"Screen Printing"

ALBERT H. GRIMSHAW
Professor of Textile Chemistry and Dyeing at North Carolina State College
"Your Student Section at North Carolina State College and Its Problems"

DR. MILTON HARRIS
Director of Research for Textile Foundation Research Associateship at National Bureau of Standards
"The Research Program of the Textile Foundation at the National Bureau of Standards"

PROFESSOR A. R. MACORMAC and DR. C. A. BASORE
Alabama Polytechnic Institute
"Methods for Increasing the Consumption of Cotton"

THOMAS R. SMITH
Superintendent of Yarn Dyeing at Wiscasset Mills
"Modern Package Dyeing Equipment"

JAMES W. STALLINGS
Stein, Hall & Co.
"The Role of Starch in Textiles"

WM. A. STRINGFELLOW
Ciba Company
"Dowicides in the Textile Industry"

SUMNER H. WILLIAMS
General Dyestuff Corporation
"The Dyeing of Naphtols on Cotton Piece Goods by the Continuous Hot Flue Method"

C. G. WORTHINGTON
Research Fellow, State Engineering Expt. Station
"Flax—Its Agricultural and Industrial Possibilities"

DR. CARL Z. DRAVES
Ludlow Mfg. & Sales Co.
"The A.A.T.C.C. Official Method for the Evaluation of Wetting Agents"

Abstracts

of papers to be presented at Eighteenth Annual Meeting

The Testing of Textile Fabrics

ROBERT H. ADAMS
Calloway Mills

THE three principal elements which affect the testing of textile fabrics are considered; namely, the human element, mechanical factors and atmospheric conditions.

Some Fundamental Differences in Printing With Pigments

HENRY L. YOUNG
Aridye Corporation

SUCCESSFUL printing with pigments necessitates reduction of pigment particles to almost molecular proportions. These ultra small particles must be incorporated in the proper vehicle so as to cover the individual fibers and give maximum tinctorial strength and minimum crocking. The vehicle must form a bond with the fibers which is undisturbed by water, alkaline soaps, dry cleaning solvents, and mechanical action.

Because the final color particle is deposited on the fabric instead of being developed there by means of a chemical reaction, pigment printing entails certain beneficial alterations in application and after-treatment. Color mixing and matching is simplified because a preliminary test can be made with a finger spot and a patch can be pulled in the final shade. This also assures positive control at all times during printing.

A vehicle designed specifically for printing on cloth will have a lower surface tension than the usual pastes in order to obtain rapid wetting of the fibers and quantitative filling and emptying of the pores of the engraving. In this way the sharpness of mark is increased and there is complete fidelity in reproduction. This can be accomplished with less set and greater machine speed.

After-treatment is reduced to a rapid drying or heating to expel volatiles and to set the binder. Variations in color strength are eliminated because the color does not have to be developed by chemical reaction which depends on variables of temperature, concentration, and time.

Among the other advantages of pigment printing is a greater safety factor in pre-treatment. Incomplete removal of sizing in boiling and bleaching does not interfere with fixation of pigments as it does with water pastes.

Though many problems are yet to be solved, the economic and technical advantages of pigment printing have already brought about its widespread use.

Your Student Section at North Carolina State College and Its Problems

PROF. ALBERT H. GRIMSHAW
North Carolina State College

The Student: His high school preparation and his color vision in relation to courses in textile chemistry and dyeing.

The Curriculum: Balance between theoretical and practical experience; bringing the mill to the student; introducing the student to the technical journals and to technical literature.

The Graduate: Placement of the graduate; relation of the graduate to his college; experience of the graduate as a guide in changing the undergraduate curriculum.

Research Program of the Textile Foundation At the National Bureau of Standards

DR. MILTON HARRIS
Director of Research for Textile Foundation Research Associateship at National Bureau of Standards

THE aim of the new research program of the Textile Foundation at the National Bureau of Standards is to obtain fundamental data on the chemical and physical chemical properties of textile fibers. It is intended that such data will form a background for the study of many of the problems in textile processing.

The work which is being undertaken is divided into cellulosic fiber investigations dealing with cotton and rayon and protein fiber investigations dealing with silk and wool. The following investigations are now in progress: a study of the acidic and basic properties of silk, wool, and cellulosic fibers, the polyuronides in cellulose and their relation to fiber structure, the effect of oxidizing agents on cellulose, the cell structure of wool, the effect of oxidizing and reducing agents on wool, a study of the reactive groups in silk, the electrophoretic properties of textile fibers, and a microscopic study of the structure of the fibers.

A brief discussion of these projects and their relation to practical processing problems will be presented.

Possible Methods for Decreasing the Consumption of Cotton

DR. A. R. MACORMAC and DR. C. A. BASORE
Alabama Polytechnic Institute

SO far the efforts made to solve the economic problems of the cotton industry have been along the line of restricted production. The results have not been entirely successful. We feel that a much more promising solution of this problem would result from a coordinated program of technical research aimed at the development of new uses for cotton and cottonseed products.

Cotton is usd in two fields, as a fiber in the textile industry and, as a source of alpha cellulose in the paper pulp and rayon industries. In the textile industry it has the advantage of cheapness over linen, wool, silk and rayon, so that there is ample field for use of relatively costly processing methods to make cotton a competitor of the other fibers.

The second field for the development of new uses of cotton is in the use of cotton, linters or the whole cotton

plant, as a source of cellulose pulps.

The third possible field for research is in the development of uses for by-products of the cotton industry such as seeds, hulls, stalks, oil, etc.

Thus three classes of problems suggest themselves:

(1) Changes in the physical and chemical properties of cotton whereby the cotton may become a serious competitor of linen, wool and silk.

(2) Development of a luster or finish on cotton comparable with or superior to rayon.

(3) Intensive utilization of linters, stalks, seeds and hulls in the chemical industry.

The Role of Starch in Textiles

JAMES W. STALLINGS
Stein, Hall & Co.

A description of starches and starch products. Proper selection and application in finishing and printing.

The Dyeing of Naphtols on Cotton Piece Goods by the Continuous Hot Flue Method

S. H. WILLIAMS
General Dyestuff Corporation

AS the mechanical set-up in dyeing Naphtols is as important as the chemistry of dyeing, we hope in this paper to bring out the important factors governing the control of this process by the use of new, improved equipment that has been developed up to the present time.

The four major factors governing the control of this process are as follows:

No. 1. Padding operation.
No. 2. The proper drying of the Naphtolated material.
No. 3. The control of the developing liquors.
No. 4. The after-treatment.

By combining the most suitable color combinations on up-to-date machinery, improved Naphtol dyeings are now produced that are far superior to work that has been done in this field a few years back.

Flax—Its Agricultural and Industrial Possibilities

C. G. WORTHINGTON
Research Fellow, State Engineering Experiment Station, Atlanta, Ga.

FLAX was the principal fiber crop of Colonial America, but cheap cotton has practically destroyed its production in this country. The great importations of flax seed, fiber and fabric today coupled with the threat of war in Europe that might cut off our present supplies seem to justify the expansion of flax production in this country. For the past three years the Tennessee Valley Authority in cooperation with the Georgia State Agricultural and Engineering Experiment Stations have been studying the possibility of adapting flax to the farming of the state and to the cotton textile, cottonseed oil and paper industries.

There is a substantial market for domestic flax fiber in the mixed fiber fabrics now being produced in increasing quantities by the cotton textile mills. The fiber must, however, be made available in a "cottonized" form and at an attractive price. The problem of developing a low cost method of processing the fiber and utilizing it on cotton machinery has been under investigation at the Engineering Experiment Station.

New mechanical and chemical methods are being tried on a pilot plant scale. The fiber bundles are first extracted from the straw by mechanical decortication after artificial drying. They are then subjected to chemical treatment under pressure to remove the gums binding the individual fibers together and to digest any wooly material present. Further mechanical treatment puts the fiber in condition for spinning on the regular cotton system. Mixtures of cotton with the "cottonized" flax improves its spinning quality and the strength of the resulting yarns. Stapled rayon may also be combined to advantage. Toweling, summer suitings, draperies, upholstery fabrics, and table cloths have been produced. It is too early yet to say what costs of processing and utilization will be on a commercial scale.

The A.A.T.C.C. Official Method for the Evaluation of Wetting Agents

DR. CARL Z. DRAVES
Ludlow Mfg. & Sales Co.

The convenience and accuracy of the official method in comparison with the canvas disc method. The adaptation of the official method given in the 1938 Year Book for use with very dilute solutions of wetting agents.

Modern Package Dyeing Equipment

THOMAS R. SMITH
Wiscassett Mills Co., Albemarle, N. C.
With Moving Pictures by:—
W. A. WOLHAR
Rosemary Mfg. Co., Roanoke Rapids, N. C.

A DESCRIPTION of up-to-date package dyeing equipment for cotton yarn, both mercerized and unmercerized and the important features of the machinery which must be considered to insure efficient operation and a superior quality of dyeing.

The uniform winding of the yarn both as to size and density, the metal used in the construction of the machine, the pump, controlled temperature and many other points will be discussed.

A comparison of the different types of extraction and drying that are now in vogue and an attempt to point out the advantages and disadvantages of each.

The economy of using nickel alloy metals eliminating rust and making brighter shades possible. Also the increased production that is accomplished through the employment of these improved metals.

Screen Printing

RALPH D. GREENE
Calco Chemical Co.

This paper discusses various methods of screen printing including the hand method, the resist or wash out method, the photographic method and the equipment used.

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Eighteenth Annual Meeting

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Chairman, Technical Program Committee

ROBERT W. PHILIP
Chairman, Southeastern Section
Chairman, General Convention Committee

ALLEN JONES
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Vice-Chairman, General Convention Committee.

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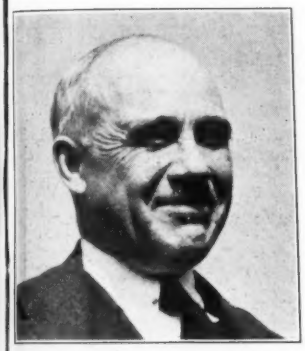
A. K. HAYNES
Chairman, Banquet Committee



GEORGE H. SMALL
Chairman, Reservation and Registration Committee

ANNUAL MEETING AND CONVENTION

American Association of Textile Chemists and Colorists

DECEMBER 2 AND 3

ATLANTA-BILTMORE HOTEL

ATLANTA, GEORGIA

W. B. GRIFFIN
Chairman, Exhibit and Souvenirs Committee

P. G. WEAR
Chairman, Entertainment and Transportation Committee

EARLE MAULDIN
Chairman, Publicity and Printing Committee

MRS. JAMES IVEY WHITE
Chairman, Ladies' Committee

ONE HUNDRED AND NINETEENTH COUNCIL MEETING

THE Council held its 119th meeting at the Engineers' Club in Boston, on Friday morning, October 21, 1938. Present were President Alban Eavenson, presiding; William R. Moorhouse, Treasurer; Louis A. Olney, Chairman of the Research Committee; William H. Cady, Past President; Walter M. Scott, Councilor at Large; Dexter R. Kneeland representing Northern New England, and Henry F. Herrmann representing New York; Carl Z. Draves and Robert W. Philip representing Annual Meeting committees; and Harold C. Chapin, Secretary. The Secretary's report of the 118th Council meeting, the Treasurer's report of October 21, and the Secretary's balance sheet attached hereto, were accepted.

Mr. Herrmann and Mr. J. R. Bonnar were appointed a committee to express the appreciation of the Council for Dr. Hans Meyer's services to the Association, and its regret at his death. The resolution follows:

November, 1938.

To the Friends of the late Dr. Hans Meyer:

On the occasion of the 119th Meeting of the Council of the American Association of Textile Chemists and Colorists at the Engineers' Club in Boston, on October 21st, 1938, a resolution was unanimously adopted appointing the undersigned as a committee,

to express, in behalf of the Council and the Association, their sense of bereavement over the passing of

Dr. Hans Meyer;

to acknowledge the high esteem in which he was held generally through the Association and particularly by those with whom he was most closely associated; to voice once more sincere thanks for the many labors which he unselfishly performed in behalf of the Council and of the Research Committee.

And it was further resolved that a copy of this resolution be spread upon the Minutes of this 119th Meeting of the Council, also that a copy shall be sent to Mrs. Hans Meyer with its sincerest sympathy in her bereavement and furthermore that this resolution be printed in the AMERICAN DYESTUFF REPORTER under the Proceedings of the Council.

Respectfully yours,

J. R. BONNAR

H. F. HERRMANN, *Chairman.*

E. E. Fickett, J. H. Skinkle, and C. L. Haworth alternate, were appointed tellers, with the Secretary, to count the ballots of the 1938 election. Professional audit of the Treasurer's and Secretary's accounts was authorized. The proposed new constitution published in the REPORTER of October 3 was discussed, and the method published therewith for effecting changes was approved. In conformity with this procedure two amendments were offered and signed by those present; and submitted to the REPORTER for publication.

Plans for the Annual Meeting were presented by Mr. Philip, Chairman of the Atlanta Committee, and were approved.

Each of the following was elected to the class of membership specified, as of thirty days from publication of application, provided no objection be received meanwhile by the Secretary:

Active

J. Alexander, G. L. Arakelian, C. K. Brooks, A. G. Brown, C. A. Butt, H. B. Carpenter, E. Cazzola, G. B. Chabot, Jr., B. G. Chiego, C. K. Colb, D. L. Copenhaver, E. G. Cullings, H. Ehrhardt, W. T. Evans, W. W. Gluyas, M. M. Guertin, C. T. Hendrix, H. R. Ivey, R. M. Johnson, A. Knup, D. M. Martin, P. K. McKenney, W. L. Morgan, E. L. Niles, C. S. Northern, Jr., L. A. Parker, F. W. Perry, A. W. Picken, G. K. Plotica, W. B. Robinson, V. L. Sarrailh, M. J. Shaw, C. L. Shelton, F. W. Silver, W. Stafford, J. L. Tarwater, W. O. Winkler, V. Woolley, C. Worthen and J. B. Wray.

Junior

L. Cesaletti, S. J. Ciongoli and C. M. Moor.

Associate

E. Arthurs, G. M. Bierly, Jr., S. Harada, W. L. Johnson, C. W. Merritt, M. Speizman and J. A. Thomas.

Student

C. F. H. Begg, S. Schandler, M. L. Slesinger, R. R. Fletcher, A. I. Miller and H. J. Murphy.

M. W. Moore and H. A. Wells were transferred from Junior to Active membership.

Respectfully submitted,

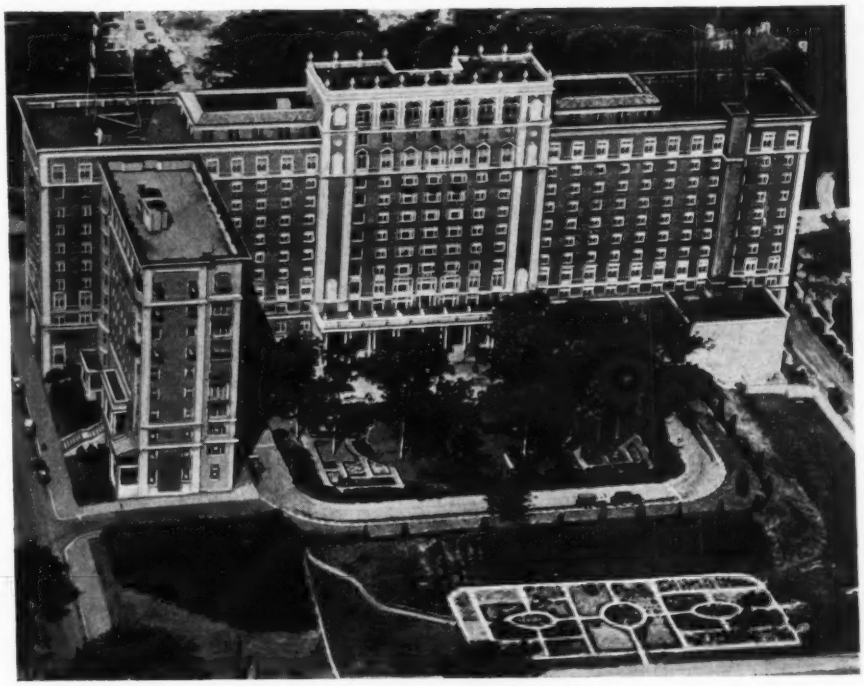
H. C. CHAPIN, *Secretary.*

SECRETARY'S BALANCE SHEET—OCTOBER 15, 1938

	Applications	*Dues, Regular and Reinstate.*	*Dues, Corporate and Sustain.*	*Miscellaneous*	*Bank Charges*	*Totals*
Received by Secretary, Nov. 1, 1937, to May 28, 1938	$1,427.50	$8,846.71	$2,530.00	$1,415.83	—$5.25	$14,214.79
Received by Secretary, May 28 to Oct. 15, 1938	327.50	123.50	.....	383.68*	— .60	834.08
Total received	1,755.00	8,970.21	2,530.00	1,799.51	— 5.85	15,048.87
Transmitted to Treasurer	1,602.50	8,930.21	2,530.00	1,691.66	...	14,754.37
Leaving to order of Secretary	152.50	40.00	.....	107.85	— 5.85	294.50

Miscellaneous Items*			
Printing Paste reports	$1.20	Dyed standards	1.00
Carbonizing reports	1.00	Buttons	10.50
Launder-Ometer royalties	80.00	Reporters	36.75
Crock-meter profits	65.58	Knitted tubing	36.90
Crock-meter cloth	14.45	Analytical Methods	1.50
Year Books	134.80	Total	$383.68

ANNUAL MEETING AND CONVENTION



Biltmore Hotel

View from garden side showing children's playground on right.

The Atlanta Biltmore Hotel, headquarters for the National Convention, December 2nd and 3rd, is known throughout the South as the supreme Southern hotel. Located outside Atlanta's downtown district, it affords quiet and pleasant accommodations which range from moderately priced single rooms to very luxurious suites. The Biltmore has two ballrooms, two dining rooms and a restaurant and is famed for its delicious meals.

Arrangements have been made with four other leading hotels, located near the Biltmore, to take care of visitors and delegates who will not be able to secure accommodations at the Biltmore.

DECEMBER 2ND AND 3RD
ATLANTA, GEORGIA

Auspices: Southeastern Section

Headquarters:—Atlanta Biltmore Hotel

MEMBERSHIP APPLICATIONS

Active

Jerome Alexander—Consulting Chemist & Chemical Engineer, New York, N. Y. Sponsors: J. F. X. Harold, B. L. Hathorne.

Gabriel L. Arakelian—Textile Chemist & Colorist, Teichmann Textile Print Works, Passaic, N. J. Sponsors: E. F. Ernst, F. Gonnerman.

Clyde Kenneth Brooks—Superintendent, Renfrew Bleachery, Travelers Rest, S. C. Sponsors: C. L. Eddy, J. D. Sandridge.

A. Gerald Brown—Supt. of Dyeing & Bleaching; Chemist, Summit Thread Co., East Hampton, Conn. Sponsors: G. W. Schmid, F. L. Warshaw.

Charles Anderson Butt—Chief Chemist, Detergent Products Corp., East Point, Ga. Sponsors: A. Jones, R. W. Philip.

Howard B. Carpenter—Supt. of Screen Printing, Kapo Dye & Print Works, Paterson, N. J. Sponsors: E. F. Ernst, F. Gonnerman.

Egidio Cazzola—Sandoz Chemical Works, Turin, Italy. Sponsors: R. Vaglio, H. C. Borghetty.

George B. Chabot, Jr.—Application Laboratory Supervisor, Calco Chemical Co., Bound Brook, N. J. Sponsors: R. R. Sleeper, H. Weiss.

Bernard G. Chiego—Consulting Chemist, Pharma-Chemical Research Laboratories, Newark, N. J. Sponsors: R. J. Reynolds, A. N. Graves.

Charlie Kench Cobb—Secretary & General Superintendent, Canton Cotton Mills, Canton, Ga. Sponsors: R. W. Philip, S. I. Parker.

Dwight L. Copenhaver—Dyer, Concord Knitting Co., Concord, N. C. Sponsors: W. A. Daniel, T. R. Smith.

Eugene G. Cullings—Sales Engineer, The Foxboro Co., Charlotte, N. C. Sponsors: T. R. Smith, R. E. Rupp.

Hugo Ehrhardt—Chemist, American Textile Engineering Co., Kearny, N. J. Sponsors: R. Eck, M. Goldemberg.

William T. Evans—Asst. Hosiery Dyer Harriman Hosiery Mills, Harriman, Tenn. Sponsors: N. Grotelueschen, W. S. McNab.

William W. Gluyas—Chemist, Adams-Millis Corp., High Point, N. C. Sponsors: B. R. Harris, R. H. Souther.

Maurice M. Guertin—Salesman, Leatex Chemical Co., Philadelphia, Pa. Sponsors: J. P. Conway, R. M. Ritter.

Carl T. Hendrix—Overseer of Dyeing, Clyde Fabrics, Newton, N. C. Sponsors: H. G. Miller, H. A. Poovey.

Horace R. Ivey—Asst. Bleacher, Chemist & Dyer, Thomaston Bleachery, Thomaston, Ga. Sponsors: J. J. Haggerty, Adam Fisher, Jr.

Anthony N. DeVito—Textile Finisher, Antipyros Co., New York, N. Y. Sponsors: G. Bostick, L. H. Winnell.

Albert R. Jenny—Canadian Sales Manager, Onyx Oil & Chemical Co., Montreal, Canada. Sponsors: C. D. Ehrengart, L. P. Brick.

William D. Lutz—Chemist, Pharma Chemical Co., Philadelphia, Pa. Sponsors: M. Stead, F. L. Pepper.

Chester M. Robbins—Southern Representative, Aridye Corp., Greenville, S. C. Sponsors: A. R. Thompson, Jr., H. E. Kiefer, Jr.

Benjamin A. Roberts—Textile Chemist, United Piece Dye Works, Paterson, N. J. Sponsor: R. M. Fischer, A. Booth.

Walter O. Taubert—Supt. of Dyeing, Bigelow-Sanford Carpet Co., Amsterdam, N. Y. Sponsors: W. C. Forstall, G. R. Pensel.

Vasser Woolley—Partner, Seydel-Woolley Co., Atlanta, Ga. Sponsors: A. Jones, R. W. Philip.

Clifford Worthen—Supt. of Dyeing, F. C. Huyck & Sons, Kenwood Mills, Rensselaer, N. Y. Sponsors: J. E. Meili, A. Spalding.

J. Beacham Wray—Foreman of Bleaching & Finishing, Marshall Field & Co., Spray, N. C. Sponsors: C. B. Griffin, Jr., L. L. Baker.

Junior

Louis Cesaletti—Asst. Colorist, Eureka Printing Co., Clifton, N. J. Sponsors: F. Stubbings, L. S. Zisman.

Salvatore J. Ciongoli—Laboratory Asst. Chemist, Modern Central Dyeing & Finishing Co., Paterson, N. J. Sponsors: H. DeGroot, Jr., J. E. Meili.

Charles M. Moore—Dyeing Overseer, Houston Textile Co., Houston, Texas. Sponsors: D. S. Culberson, L. B. MacFarland.

Irving Greece—Chemist and Lacquer Color Mixer, Pilgrim Piece Dye Works, Brooklyn, N. Y. Sponsors: L. H. Winnell, C. C. Knights.

Robert M. Tarrant—Salesman, International Salt Co., Hickory, N. C. Sponsors: H. G. Miller, H. A. Poovey.

Associate

Earl Arthurs—Salesman, Solvay Sales Corp., Atlanta, Ga. Sponsors: E. A. Feimster, Jr., W. F. Crayton.

George M. Bierly, Jr.—Chemist, Keever Starch Co., Columbus, Ohio.

Sekisiro Harada—Technician in Sales Dept., Japan Dyestuffs Mfg. Co., Osaka, Japan.

William Luther Johnson—Sales Engineer, American Moistening Co., Atlanta, Ga. Sponsors: A. Jones, R. W. Philip.

Carleton W. Merritt—Asst. Superintendent, Estate of W. U. Farrington, East Greenwich, R. I.

Morris Speizman—Dye Machinery Dealer, Interstate Textile Equipment Co., Charlotte, N. C.

James Addison Thomas—Salesman, Prior Chemical Corp., New York, N. Y.

Lewis Truman Lanier—Salesman, Apex Chemical Co., Apex, N. C.

Student

James William Beattie, Jr.—New Bedford Textile School. Sponsor: F. E. Busby.

J. Henri Boulanger—Bradford Durfee Textile School. Sponsor: L. B. Coombs.

Jacob P. Felder—Bradford Durfee Textile School. Sponsor: L. B. Coombs.

Charles F. H. Begg—North Carolina State College. Sponsor: A. H. Grimshaw.

Seymour Schandler—North Carolina State College. Sponsor: A. H. Grimshaw.

M. Leonard Slesinger—North Carolina State College. Sponsor: A. H. Grimshaw.

Raymond R. Fletcher—Bradford Durfee Textile School. Sponsor: L. B. Coombs.

Arnold Irving Miller—Lowell Textile Institute. Sponsor: L. A. Olney.

Hubert J. Murphy—Lowell Textile Institute. Sponsor: L. A. Olney.

MEETING, NORTH CAROLINA STATE COLLEGE STUDENT SECTION

THE first meeting of the North Carolina State College Chapter of the American Association of Textile Chemists and Colorists this school year was held on Friday, October 14.

W. L. Carter was elected president and Seymour Schandler, secretary.

Plans are going forward for the securing of many prominent speakers to address us during the year.

Respectfully submitted,

SEYMOUR SCHANDLER, *Secretary.*

MEETING, PHILADELPHIA SECTION

THE regular meeting of the Philadelphia Section was held at the Penn Athletic Club on Friday evening, October 28th, 1938.

Dr. W. E. Coughlin, Research Associate of the Celanese Corporation with the National Association of Dyers and Cleaners, presented an excellent talk on the subject of "Fabric and Color Problems in Dry Cleaning."

Through the courtesy of John A. Roebling's Sons Company of Trenton, New Jersey the sound motion picture "Bridging a Century" was shown.

The usual informal dinner, at which eighty-one were present, preceded the meeting, while one hundred and sixteen attended the meeting.

Respectfully submitted,

J. P. CONAWAY, *Assistant Secretary.*

Amendments to Proposed Constitution

IN accordance with the procedure suggested in the REPORTER of October 3rd, the undersigned submit the following alternative wordings for Sections of the proposed constitution.

Article IV, Section 5: An Honorary Member shall be a person who has rendered distinguished service to the textile industry or to this Association.

Article V, Section 3: The Council shall have full control of the affairs of the Association, subject to the limitations of the Constitution and By-Laws. The Council may make and alter By-Laws for the government of the Association. Twenty-five per cent of the members of the Council shall constitute a quorum.

Signed:

E. H. KILLHEFFER,
J. ROBERT BONNAR,
WILLIAM H. CADY,
H. C. CHAPIN,
CARL Z. DRAVES,
ALBAN EAVENSON,
DEXTER R. KNEELAND,
W. R. MOORHOUSE,
GEORGE A. MORAN,
L. A. OLNEY and
WALTER M. SCOTT.

CALENDAR OF COMING EVENTS

Meeting, New York Section, November 25, 1938, Swiss Chalet, Rochelle Park, N. J.

* * *

Meeting, Philadelphia Section, December 9, 1938, Penn Athletic Club, Philadelphia, Pa.

* * *

Eighteenth Annual Meeting and Convention, Atlanta Biltmore Hotel, December 2 and 3, 1938

LAST NOTICE!

Eighteenth Annual Meeting and Convention

- *Make the necessary reservations as soon as possible.*
- *Bring the ladies—a special program has been prepared for them.*
- *Listen in to the radio program concerning the meeting on November 24th (10:30 P.M., C.S.T.; 11:30 P.M., E.S.T.), on Station WSB, Atlanta, 740 kilocycles.*
- *Arrive Friday morning, December 2nd, if possible.*
- *Read the preceding pages of this issue for general information, information concerning trains, tentative program of entertainment, tentative technical program and abstracts of papers.*

DECEMBER 2 and 3
ATLANTA, GEORGIA

AMERICAN
DYESTUFF
REPORTER

A. P. HOWES
Publisher

LOUIS A. OLNEY, Sc.D.
Professor of Chemistry and Dyeing, Lowell Textile Institute
Directing Editor

NORMAN A. JOHNSON
Managing Editor

MYRON DREW REESER
Advertising Manager

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Vol. 27 November 14, 1938 No. 23

DR. HANS MEYER

A KEEN loss has been felt by his business associates and the members of the American Association of Textile Chemists and Colorists in the passing of Dr. Hans Meyer. He was held in high esteem by all who knew him, both in the association and in his business activities. He was particularly active in the affairs of the association and contributed much in the way of advice and labor on behalf of its Council and Research Committee. He was ever willing to contribute whatever he could to further the activities of the association and his assistance and counsel were deeply appreciated.

EIGHTEENTH ANNUAL MEETING

AS can be seen from the information published in the proceedings of the American Association of Textile Chemists and Colorists a splendid program of technical papers and entertainment has been arranged for members who will attend the Eighteenth Annual Meeting and Convention of this Association to be held at the Atlanta-Biltmore Hotel in Atlanta, Georgia on December 2nd and 3rd. The Southeastern Section will act as hosts during the convention and the officers and committeemen of this section have spared no effort to insure a profitable and enjoyable visit to all who attend. The technical program committee, under the chairmanship of Dr. Carl Z. Draves, has assembled a group of speakers who are well qualified to present a discussion of varied subjects in their respective fields.

We will call your attention again, as the committee has already done in the Proceedings, to the radio program concerning the meeting which will be broadcast over station WSB, Atlanta, on November 24th at 10:30 P.M. (Central Standard Time) 11:30 P.M. (Eastern Standard Time). No doubt the program will be of interest to all members. The station broadcasts on a wavelength of 740 kilocycles.

We urge you to attend this meeting if it can possibly be arranged and, in order to assist the various committees in carrying out their duties, please make the necessary reservations at the earliest moment. If you attend the meeting you will be assured of a cordial welcome from the members of the Southeastern Section and your visit will prove both enjoyable and profitable. The committee also urges that members bring their ladies as a special program of entertainment has been arranged for them during their stay.

Third Annual
PROCESSING REVIEW NUMBER

THE third annual Processing Review Number will appear under date of November 28th, just preceding the eighteenth annual meeting of the American Association of Textile Chemists and Colorists. Many special articles, covering developments during the past year have been prepared by specialists in the various branches of the textile wet processing field. A feature which has been well received in past issues and which will again be included this year is a listing of all products—dyestuffs, textile chemical specialties, laboratory equipment and machinery—which have been brought out during the past year. Because of the number of products it is impossible to give, in one issue, all of the details concerning these products, but the condensed description of each will give textile wet processors a good index of the names, properties and uses of each new product.

Of special interest to members attending the meeting of the A.A.T.C.C. will be the abstracts of the papers to be presented at the technical sessions. Some of these appear in the current issue but all will be included in the issue of November 28th. A complete program of entertainment features and technical presentations will also be printed. Copies of this issue of the REPORTER will be available to members at Atlanta.

ANNUAL MEETING
AND CONVENTION

A.A.T.C.C.

Atlanta, Georgia

December 2 and 3

Measures for Preventing the Destruction of Wool in Textile Processing

J. WAKELIN

IT is the concern of all technologists dealing with the treatment of wool to ensure as far as possible that the fiber receives the least possible damage. In the present account we shall confine our attention to chemical damage and ignore the more obvious sources of deterioration resulting from careless handling or too drastic mechanical treatment, for such topics belong to a different sphere.

Wool substance is very susceptible to certain destructive agencies notably alkali which brings about a very rapid hydrolysis and chemical breakdown. One must not forget, however, that perfectly natural circumstances may affect a wool fiber before it has even reached the buyer: that is, sun and air. As clipped from the sheep wool is not an homogeneous commodity but varies in quality at different parts of the fleece, but particularly are there found signs of deterioration in those fibers nearest the tip where the wool was most exposed. Such chemical damage is of course, hardly preventible within the ordinary meaning of the term, but there are means of repairing this condition to some extent. According to Speakman, the setting quality of wool and hair which is lost by exposure to ultra-violet radiation may be partially restored by treatment with aqueous solutions containing sulfites and bisulfites. A mixture of 50 parts cetyl sodium sulfate, sodium sulfite (40 parts) and borax 40 parts all by weight is dissolved at the rate of 5 pounds per 100 gallons.

More recently, Speakman has found that the uneven dyeing properties of light-exposed wool may be corrected by subjecting the material to a bath of chromium acetate. The optimum conditions are stated to be 3 per cent of basic chrome acetate, 4 per cent of acetic acid, temperature 40° C., time half an hour and the bath ratio to be 50:1 liquor to wool.

Of still more recent date is the reported discovery that to treat exposed wool fibers to 10 per cent aqueous cyanamide 47 hours at 22° C. results in making the substance more stable; sulfur linkages which are broken by light when treated with cyanamide are converted to isothiourea derivatives. Further work is to be done on this interesting new turn of affairs.

All the foregoing propositions and methods are essentially retrospective and deal with wool damaged before textile processing proper has begun. Let us now look at some of the more forward-looking proposals for reducing the damaging effect of certain chemicals in some textile processes.

The destructive effects of caustic and other alkali on wool has many implications other than the merely obvious dictum that the undue use of soda must be avoided. Wool which is limy, for example, provides an example of the indirect causation of faults sometimes brought about by the practice of attending only to one difficulty at a time without sufficient regard for other aspects. The washing of limey wool with soap, or of any wool in hard water which amounts almost to the same thing, is a difficult proceeding. The cure, however, to increase the soda content of the bath with the express intention of softening the water, is likely to be as bad as the complaint. In cases of extreme difficulty of this sort the only remedy is to remove as much of the lime first in acid as possible and then proceed to the washing proper. The other alternative, and the better one, is to employ one of the many new lime-dispersing detergents such as the oleyl taurines or sulfated fatty alcohols. In one of these wool may be safely cleansed in the presence of lime without having recourse to the adding of soda, the absence of which is reflected in the softness and loftiness of the finished goods. It will be seen that there is a reasonable argument to support the contention that auxiliaries of the Gardinol, Igepon class, may contribute very materially towards preventing chemical damage to wool. At the same time, the fiber-softening nature of some of these detergents due to their fatty nature is not to be entirely overlooked.

Printing process in which discharge effects are obtained with sulfoxylate mixtures are sometimes accompanied by spoilation and tendering of the wool substance. This is attributed to the fact that on decomposing, sulfoxylates yield sulfides which attack the fiber material. A patent to the Society of Chemical Industry in Basle discloses the information that the drawback may be minimized or even overcome by introducing a salt of chloracetic acid into the discharge paste, which is believed to react with and mollify the harmful sulfides. A suitable paste may contain 25 parts of a mixture of

Sodium sulfoxylate ..... 70 per cent
Zinc oxide ..... 30 per cent

to which is added also 10 parts of sodium monochloracetate, 10 parts of glycerol and 10 parts urea. Fifty parts of 1:1 British gum provides the necessary thickening.

Woolen fabric dyed first with a dischargeable dye is printed with the above and subjected to moist steam for 5 to 6 minutes and then washed. A very considerable improvement and amelioration of the tendering difficulty is said to be attained: prints obtained without the use of chloracetate at the same time are seriously weakened in tensile strength.

The application of acid dyestuffs to wool in a medium of mineral acid and Glauber's salt is an everyday occurrence in textile mills and dyehouses but one must not allow familiarity to breed contempt of the fact that in certain cases damage is done by the acid or by excessive boiling. The necessity for matching of shades to pattern often brings about a long contact of wool and dye liquor, especially if the shade be a tricky one, or the dyes show unlevelling tendencies. Dyes differ very considerably in their properties as regards the amount of acid and boiling required, some demand relatively little of either and in those cases fiber damage is likely to be insignificantly small.

One very intelligent approach to this problem is the suggestion that the affinity of the wool should be increased so that dyeing may be brought about with less acid and shorter boiling time, or lower temperatures. Especially is this angle significant in the case of susceptible materials used in conjunction with dyes of low affinity, where much persuasion by acids must be applied in order to cause them to take to the fiber.

Certain quaternary amines and sulfur compounds have received attention as possible reagents for increasing fiber affinity and simplifying dyeing practice. Octadecyl pyridinium bromide, for example, is suggested for this work. This compound is obtained by the alkylation of the tertiary amine pyridine with an equimolar quantity of the fatty alcohol halide, octadecyl bromide. (The nitrogen atom becomes pentavalent.)

According to a patent, skins such as are normally not dyed with acid colors on account of the destructively high temperatures demanded, may be effectively dyed after treatment with an aqueous solution of this compound. Thirty minutes' immersion in a 3 per cent solution at 40° C. so mordants the skins that they may be dyed with Acid Green G (Colour Index 66) at 40° C. Presumably this procedure could be extended to the field of wool dyeing also.

The I. G. Farbenindustrie find that some "quaternary" compounds derived by alkylation of phosphines and mercaptans have a mordanting influence on wool and enable acid-dyeing to be carried out with less acid and in some instances, at temperatures as low as 40° C. The application of one of the complex chromium-containing dyes to wool, is indicated. The material is first treated with a 0.3 per cent aqueous solution of triethyl-dodecyl phosphonium bromide for an hour at 50° C. Following this, it is dyed with 1.5 per cent of a dye with the addition of 5 per cent of sulfuric acid of 66° Baumé strength.

The attention which is drawn to the complex chromium-containing dyes will remind many readers how that these colors usually demand a high proportion of acid and are consequently likely to bring one up against the deterioration difficulty as quickly as any. While it is generally conceded that the high proportion of acids used in dyeing with metalliferous dyes causes no obvious damage to the wool fiber, no one would suggest that the treatment is beneficial. In fact, the less acid used the better from the standpoint of convenience in operation and freedom from corrosion of metal parts and its concomitant history of off-shades due to metallic interference.

Although glue is primarily employed for the commonplace purpose of sticking things together, it has also found a limited sphere of application in the processing of textile fibers, its principal role being that of a protective agent for wool. Its addition to the soap-and-soda scour bath was recommended by Rinoldi some twenty years ago wherein a reduction of chemical damage in washing was said to be achieved. It is perhaps permissible to assume that the glue and wool substance are alike, that they are both sensitive proteins, the glue being even more unstable than the wool keratin. Hence agencies which attack the wool would first be diverted and act on the glue instead.

A patent has been obtained covering the use of glue as a protective agent in the acid-dyeing of wool with chromium-containing or other metalliferous dyestuffs. A specimen dye may be the chromium compound of the diphenyl-naphthylmethane compound from 2-hydroxyl-1-naphthaldehyde-3:6-disulfo acid and ortho cresotinic acid. A bath may contain 6 per cent of the above, 4 per cent sulfuric acid and 5 to 10 per cent glue. Ammonium chloride or fluoride may also be added to the bath. It is stated that dyeing with colors of this type may be done with proportions of acid normal for other acid colors, instead of high concentrations. Thus a protective action is obtained and simultaneously the quantity of destructive acid is reduced.

The protective possibilities of glue are seen more distinctly in a recent patent published in April, 1938, namely, British Patent 482,656 which deals with the chlorination of wool. It is already known to readers that the treatment of this fiber with hypochlorites results in an increased luster, a greater affinity for certain dyes and a diminution in the tendency to felting. (The specification does not mention shrinking, although this might naturally be inferred.) The admixture of sodium hypochlorite and acid causes almost immediate violet decomposition and the liberated chlorine tends to attack the wool too ferociously and unevenly, the result being in some cases, localized tendering.

The new patent reports that the presence of amines, amino acids and protein degradation products steadies the reaction due, it is suggested, to the formation of an intermediate product. Thus, in an example, when wool was treated with a mixture of hypochlorite and sulfuric acid alone, the reaction which was vigorous at first quickly subsided and after 10 minutes there were only traces of chlorine in the liquor. (As shown by starch-iodide paper.) When amino acetic acid was present tests proved that over 90 minutes were required for the completion of the reaction. This control over the speed of chlorination brings about a reduction in the felting qualities of the wool.

The following practical details will illustrate broadly the principal points of the invention. Twenty-five grams of zephyr wool yarn were immersed at room temperature for one hour in the following liquor: One gram of active

chlorine in the form of sodium hypochlorite, 2 grams 92 per cent sulfuric acid, 0.5 gram of a 50 per cent solution of protein degradation products obtained by the hydrolysis of leather, and 760 grams water. After withdrawal, the yarn was well rinsed and dried.

Subsequently the treated yarn was treated with soap and soda in a felting machine and then compared with similar yarn non-chlorinated, and with yarn chlorinated without an addition of protein derivative. Whereas the untreated was strongly felted and the material chlorinated without addition slightly felted, the yarn treated as described with the addition of protein decomposition product was not felted at all.

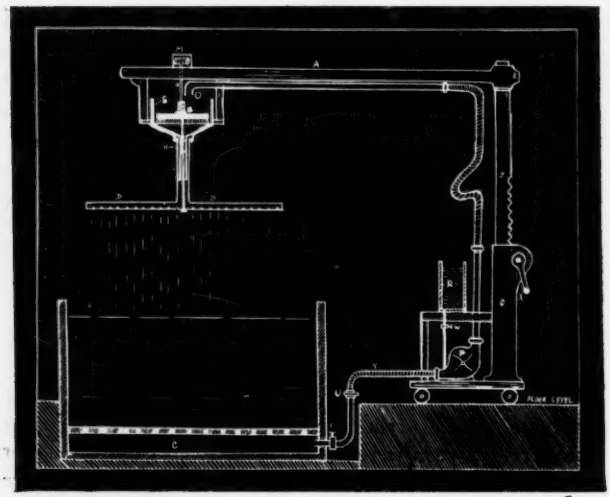
A New Device for Facilitating the Addition of Salting Dyestuff to Manually-Operated Dye Kettles for Loose Stock

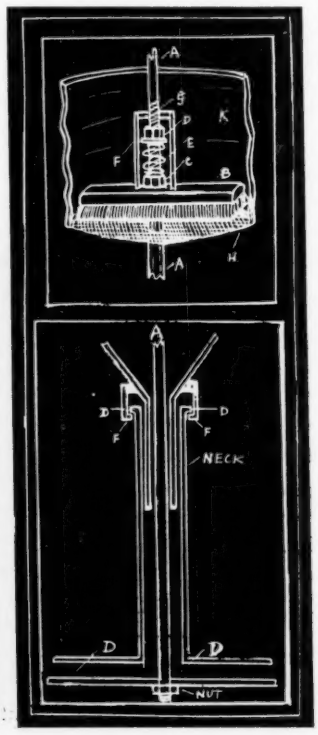
S. WOUBLE

MANUALLY-OPERATED dye kettles for loose stock difficult to process in mechanical apparatus still continue to be employed. One concern known to the author has several manually-operated dye kettles installed alongside up-to-date mechanical apparatus. One of the chief difficulties encountered in the processing of loose stock in manually-operated dye kettles consists in securing a level color following the addition of chrome and inferior levelling acid dyes to the boiling bath. The usual way of making an addition of salting dye is to sprinkle the color solution on top of the stock while it is being energetically poled by two operatives. This rough and ready method seldom gives a satisfactory result unless the dye is diluted with an inordinate amount of water; in that event, the liquor level rises to an inconvenient height and after two or three similar color additions, part of the liquor has to be let down the sewer. This disturbs the balance of the bath and may lead to partial boiling-off of the more soluble component dyestuff already on the fiber.

In Fig. 1 is depicted in sectional form the elevation of an apparatus designed by the author to facilitate uniform addition of salting dye to a manually-operated dye kettle for loose stock. The contrivance is mounted on wheels so that it may be brought alongside any kettle in the plant. The inlet pipe of the electrically-operated rotary pump, P, is then attached by means of the flexible pipe, Y, and the hexagon coupling, U, to a short pipe provided with a facuet, F, to control the flow of liquor from the space, C, between the false and true floors of the kettle. The storage tank, R, for the solution of salting dye is permanently connected to the inlet pipe of the pump by means of a length of pipe provided with a faucet, W, to govern the flow from the tank. The discharge pipe of the rotary pump terminates at O, over a box-like construction, having a perforated bottom like a sieve. The function of the sieve is to remove flock from the liquor discharged from the pipe, O. To circumvent choking of the sieve, a rotable brush is installed to clear the perforations of flock. In Fig. 2, details of the sieve and brush are given. K, depicts the wall of the sieve, H, being the wire bottom; the stock of the brush, B, is affixed to the spindle, A, by means of the hexagon nut, C, there being also a similar nut on the lower side of the stock. A screw thread, G, is cut on the spindle to suit the two nuts. The nut, D, is screwed up or down the spindle, A, when it is desired to slacken or tighten the helical tension spring E of the brush in order that the latter may press with diminished or increased force on the wire mesh of the seive. The spindle is protected against corrosion by enclosing in a Monel metal sheath.

Below, Fig. 1; Right, Fig. 2.





A tubular cover, F, is installed to protect the spring from corrosion by dye liquor. The flanges, D, F, on the neck of the distributor should be made of incorrodible metal otherwise they will seize up and thus prevent easy rotation of the distributor, D. M, is the electric motor for rotating the distributing mechanism. The arm, A, has a swivel joint, E, so that it can be swung over the center of the dye kettle. X, is the handle for operating the rack on the upright, J, in order that the distributor can operate at a suitable height above the top of the kettle.

Textile Testing

(Continued from page 640)

3. Proximate analysis—the determination of some chemical or physical constant of the mixture and the calculation from this of the composition of the mixture. Examples of this type of analysis which have been used are:

a. Determination of specific gravity of a mixture and calculation from it of the composition—suggested for cotton-wool mixtures (see Table X).

b. Determination of the fluidity of a mixture of cotton and viscose and calculating the percentage composition knowing that the fluidity of cotton in one-half per cent solution is 1 to 2 and of viscose is 36 to 40. For the determination of fluidity, see Chapter 13.

c. Determination of the nitrogen content (by the Kjeldahl method) of a mixture of animal and vegetable fiber and calculation of the composition. This is rather inaccurate because of the variable nitrogen content of the animal fibers, also because of the presence of nitrogen-containing dyes, finishing compounds, or weighting.

d. Determination of the P_2O_5 content of a mixture of wool and Lanital and calculation of its composition (Lanital = 1.80 per cent P_2O_5). This is more tedious and no more accurate than other methods.

Proximate analyses tend to be inaccurate, in general, because of the variation in the constant determined in one or more of the constituents of the mixture.

4. Chemical analysis—this consists in weighing a sample, dissolving out one component, weighing the residue, and continuing the process until the composition is known. Nearly always a reagent which removes one fiber has some effect on another, so that in general correction factors are necessary. This method of analysis is in most common use and will be considered in more detail.

The reagents used for chemical methods of analysis for the common fiber mixtures are as follows:

1. Acetate rayon and any other fiber mixtures.
   - *a. Acetone.
   - *b. Glacial acetic acid.
2. Cotton-wool or rayon-wool mixtures.
   - *a. Potassium hydroxide.
   - b. Aluminum chloride.
   - *c. Sulfuric acid.
3. Silk-cotton or silk-wool mixtures.
   - *a. Hydrochloric acid.
   - b. Ammoniacal nickel oxide.
   - *c. Concentrated calcium thiocyanate.
   - d. Basic zinc chloride.
4. Silk-rayon mixtures.
   - a. Dilute calcium thiocyanate.
   - b. Copper glycerol hydroxide.
   - c. Ammoniacal nickel oxide.
   - *d. Potassium hydroxide.
5. Cotton-rayon mixtures.
   - *a. Concentrated calcium thiocyanate.
   - b. Semi-saturated chromic acid.
   - c. Sodium zincate.

Of the above, many, in the author's experience, give very erratic results. The methods marked by an asterisk (*) are the most satisfactory and are sufficient to take care of any mixture of the common fibers. These methods will be given in detail.

Acetone method—dry and weigh the sample (about 5 grams), warm in a beaker with 250 cc. of acetone for 30 minutes, filter through a Gooch filter (or 100-mesh screen), wash twice with acetone, then with water, dry and weigh. Acetone rayons with a few exceptions are completely soluble, other fibers are insoluble. If the acetate rayon is found by a previous test to be not completely soluble in acetone, use the glacial acetic acid method.

Glacial acetic acid method—dry and weigh the sample (about 5 grams), drop into 250 cc. of boiling glacial acetic acid and boil for 20 minutes, filter through a Gooch filter (or 100-mesh screen), wash with glacial acetic acid, wash with water, wash with dilute ammonia, wash with water, dry and weigh. This treatment dissolves all acetate rayons but somewhat affects other fibers (see Table XVI).

Potassium hydroxide method—dry and weigh the sample (about 5 grams), drop into 250 cc. of boiling 5 per cent potassium hydroxide and boil for 15 minutes, filter through a Gooch filter (or 100-mesh screen), wash with potassium hydroxide solution, wash with water, wash with dilute acetic acid, wash with water, dry and weigh. This dissolves wool and silk, the residue is cotton or rayon. Acetate rayon is partly soluble to such a variable extent that no correction factor can be given; it should, however, have been already removed by acetone or glacial acetic acid. In routine work, where the expense of the reagent is a consideration, sodium hydroxide may be used instead of potassium hydroxide; for important work or referee work, the potassium hydroxide should be used.

Hydrochloric acid method—dry and weigh the sample (about 5 grams), drop into 250 cc. of concentrated hydrochloric acid at room temperature for 15 minutes, filter through a Gooch filter (or 100-mesh screen), wash with concentrated hydrochloric acid, wash with water, wash with dilute ammonia, wash with water, dry and weigh. This treatment dissolves silk but not cotton or wool; rayons and acetate rayons are partially dissolved and no correction factor can be given.

Calcium thiocyanate method—the official method of the A.S.T.M. and the Bureau of Standards is too critical and requires special apparatus; the following method is simpler and as accurate. Dry and weigh the sample (about 2

TABLE XVI

Quantitative Analysis of Fiber Mixtures

Solubility in Various Reagents

	*Acetone Method**	*Glacial HAc Method**	*5% KOH Method*	*Cold, conc. HCl Method*	*1.36 sp. gr. $Ca(SCN)_2$ Method*	*A.A.T.C.C. H_2SO_4 Method*
WOOL Mohair Camel hair	0%	1.5%	100%	0.5%	2%	0%
SILK Tussah	0%	5%	100%	100%	100%	100%
ACETATE RAYON	100%*	100%	Partly soluble	Partly soluble	100%	100%
VISCOSE RAYON Cupra rayon	0%	3%	5%	Partly soluble	100%	100%
COTTON Merc. cotton Linen Ramie	0%	2%	3%	4%	2.5% 4%	100%

*A few cellulose acetate rayons are not completely soluble in acetone, if the sample (by test) is one of these then the glacial acetic acid method should be used, otherwise the acetone method is preferable.

grams). Prepare a solution of calcium thiocyanate of specific gravity = 1.36 and place 200 cc. of the solution, in a flask, in a boiling water bath or steam bath so that the temperature is 100° C., do not boil the solution. Drop the sample into the solution and leave for one hour, stirring it well every 15 minutes. Filter through a Gooch filter, wash with calcium thiocyanate solution, then wash well with water, dry and weigh. The calcium thiocyanate may be recovered by diluting with water until the dissolved fiber is precipitated, filtering, and concentrating again to 1.36 specific gravity. This treatment dissolves silk, rayon, and acetate rayon but not wool or cotton.

Sulfuric acid method—older methods were very unsatisfactory, but the recently developed method of the A.A.T.C.C. is very satisfactory. Dry and weigh the sample (about 2 grams), immerse the sample in 200 cc. of a boiling 1 per cent solution of sulfuric acid for 7 to 10 minutes, transfer to a Gooch filter and remove the excess acid by suction. Place the sample in 200 cc. of a 70 per cent solution (by weight) of sulfuric acid at 100° F. (38° C.) and work it for 15 minutes. Filter on a Gooch filter (or 100-mesh screen) and wash well with cold water, then place the sample in a beaker of 2 per cent sodium bicarbonate at room temperature for 5 minutes. Filter again, wash well on the filter, dry and weigh. This method dissolves all the ordinary fibers except wool which is left as a residue; no correction factor is necessary for a normal wool.

Table XVI gives the solubility of the various fibers by the above six methods. If we remember that the glacial acetic acid method is only an emergency method for use on a few cellulose acetates, we may say, then, that the five methods remaining will take care of any case which may arise. It will be noted that in several cases in Table XVI are the words "partly soluble"; in these cases the method cannot be used if the fibers in question are present because the fibers dissolve to a considerable extent but cannot be corrected for due to their extreme variation. Thus if silk, viscose, and cotton are present, we cannot first dissolve the silk with cold concentrated hydrochloric acid because the viscose dissolves an an unknown extent; in this case the potassium hydroxide method would be used for silk, followed by the calcium thiocyanate method for viscose. The fibers given in capitals are the principal fibers met with, those beneath in small letters are the less common fibers to which the correction factors will *probably* apply.

The methods to use will depend upon what fiber mixture we have; in some cases there will be a choice of methods, in this case the choice will be governed by the accuracy desired or the convenience or speed of the method. The following mixtures of two fibers may arise:

1. Acetate rayon and any other fiber—use the acetone method.

2. Cotton and wool—use the sulfuric acid method for the most accuracy, or the potassium hydroxide for less critical work.

3. Cotton and silk—use the potassium hydroxide method, the hydrochloric acid method (less accurate), or the calcium thiocyanate method (expensive reagent, longer time).

4. Cotton and viscose—use the calcium thiocyanate method.

5. Viscose and wool—use the potassium hydroxide method (less accurate), the calcium thiocyanate method, or the sulfuric acid method (best).

6. Viscose and silk—use the potassium hydroxide method.

7. Silk and wool—use the hydrochloric acid method

(most convenient), the calcium thiocyanate method, or the sulfuric acid method.

In analyzing mixtures of three or four fibers, we may remove one fiber, weigh, remove another fiber and weigh again; another and more accurate method is to take two samples and make a different determination on each; this last method avoids the use of more than one reagent on any residue and thus does not create an unknown correction factor; the second method is also quicker since only two dryings are necessary instead of three or four. For example, a mixture of cotton, wool, and silk could be analyzed on one sample by treating with hydrochloric acid and weighing, then treating with potassium hydroxide and weighing again, but the acid treatment might alter the cotton so that the correction factor for the potassium hydroxide residue was not 3 per cent but some higher figure. A more accurate way would be to determine wool on one sample (by the sulfuric acid method) and cotton on another sample (by the potassium hydroxide method) and determine the silk by difference. By the use of Table XVI, the various combinations of methods to use for various combinations of fibers may be determined. Of course, acetone does not affect any of the fibers except acetate rayon, so a mixture of acetate and any other number of fibers is first treated with acetone to determine the acetate rayon and is then treated with further reagents.

The correction factor is the figure by which a weight of a given residue must be multiplied to give the true weight of the residue before the chemical treatment took place. If we let

S = solubility given in Table XVI

C = correction factor

Then $C = \frac{100}{100\text{-}S}$ or $C = \frac{1}{1 - S/100}$

Thus the correction factor for cotton, after the potassium hydroxide treatment is 100/100-3 = 100/97 or 1/.97. Wool after the sulfuric acid treatment requires no correction, and none of the fibers require correction after the acetone process. The use of the correction factors may best be shown by examples:

1. Mixture = cotton and wool.
   Method used = potassium hydroxide.
   Residue = cotton.
   Correction factor = 100/100-3 = 100/97.
   Weight of sample = 5.14 grams.
   Weight of residue = 2.39 grams.
   True weight of cotton = 2.39x100/97 = 2.46 grams.
   % cotton = 2.46x100/5.14 = 47.9%.
   % wool = 100 — 47.9 = 52.1%.
2. Mixture = cotton, wool, silk.
   Method used = hydrochloric acid method followed by potassium hydroxide method.
   Weight of sample = 4.98 grams.
   Weight residue after HCl = 3.05 grams.
   Weight residue after KOH = 2.13 grams.
   Weight of cotton before KOH = 2.13x100/97 = 2.20 grams.
   Weight of wool before KOH = 3.05 — 2.20 = 0.85 grams.
   Weight of cotton before HCl = 2.20x100/96 = 2.29 grams.
   Weight of wool before HCl = .85x100/99.5 = 0.85 grams.
   Weight of silk before HCl = 4.98-2.29-.85 = 1.84 grams.
   % cotton = 2.29x100/4.98 = 46.0%.
   % wool = 0.85x100/4.98 = 17.1%.
   % silk = 1.84x100/4.98 = 36.9%.
3. Mixture = silk, wool, viscose.
   Methods used = sulfuric acid (sample A) and potassium hydroxide (sample B).

   A

   Weight of sample = 2.0575 gms.
   Weight residue = 0.5500 gms.
   True weight of wool = 0.5500 gms.

$$\% \text{ wool} = \frac{0.5500}{2.0575} \times 100 = 26.8\%$$

   B

   Weight of sample = 4.9590 gms.
   Weight residue = 2.4865 gms.
   True weight of viscose = 2.4865x100/95 = 2.62 gms.

$$\% \text{ viscose} = \frac{2.62}{4.96} \times 100 = 52.8\%$$

   % silk = 100 — (26.8 + 52.8)
   = 100 — 79.6
   = 20.4%

In addition to the cases discussed, there are certain special cases which deserve mention:

1. Mixtures of fibers in the same group of Table XVI—for example, mixtures of wool and mohair or cotton and linen. These mixtures cannot be analyzed by chemical means but must be picked apart mechanically if possible or analyzed by means of the microscope; this will be given in a later section.

2. Mixtures of fibers of which one fiber is not normal but has been degenerated by some previous treatment—for example, mixtures of shoddy (somewhat degraded wool) and cotton. These are best analyzed by a method which dissolves the degenerated fiber and leaves the normal fiber as a residue.

3. Felts—these are so compactly packed that certain removal of relatively small amounts of cotton is nearly impossible, on the other hand, if the larger amount of wool is removed the cotton does not hinder the operation so much. The A.S.T.M. standard method for felts is the same as the potassium hydroxide method except that 5 per cent sodium hydroxide is used and the solubility of the cotton is then 5 per cent (correction factor = 100/95).

4. Mixtures of asbestos and organic fibers. These are analyzed by taking a 5 gram sample which is ignited in an electric furnace at 800 to 810° C., after which the residue (asbestos) is weighed. The asbestos loses about 14 per cent in weight due to water of crystallization, so that the correction factor of 100/86 is used.

5. Mixtures of wool and Lanital. A 2 gram sample is placed in 100 cc. of 20 per cent sodium hydroxide at 30° C. for 3 hours during which time it is frequently stirred. The residue is filtered out, washed, treated with dilute acetic acid, washed again, dried and weighed. The Lanital, which is the residue, loses a variable amount of weight by this process, so if possible a blank should be run on a sample of Lanital. If a blank is not available, a 10 per cent loss may be assumed (correction factor = 100/90) although this loss will probably vary considerably and the result must not be depended upon too much.

References:

(1) Matthews, J. M. Textile Fibers. John Wiley & Sons, Inc., New York. 1924.

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(4) Year Book of the A.A.T.C.C.—Volume XIV. Howes Publishing Co., Inc., New York. 1937.

(5) Krais, P. and Markert, H. Quantitative Determination of Cotton, Wool, Silk, and Artificial Silks in Mixed Textiles. Journal of the Textile Institute *23,* P213 (1932).

(6) Mease, R. and Jessup, D. Analysis of Textiles. American Dyestuff Reporter *24,* 613 (1935).

(7) Ryberg, B. Determination of Wool in Wool-Cotton Textile Materials. American Dyestuff Reporter *25,* 296 (1936).

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(To be continued)

TRADE NOTES • NEW PRODUCTS

OBITUARY

HANS MEYER, well known textile chemist during the last 42 years, died at his home in White Plains, N. Y., on October 6th, 1938.

Hans Meyer

He was born in Bavaria, Germany, 64 years ago. He showed a keen interest in chemistry at an early age. His universities were Heidelberg, Munich and Bern where he obtained the degree of Ph.D. at the age of 22. He was immediately engaged by Badische Aniline and Soda Fabrik of Ludwigshafen where he specialized in the application of textile dyes. At the beginning of 1907 he entered the American agency of the Ludwigshafen concern, serving in this position until he joined General Dyestuff Corporation in January, 1926. He remained active with this firm until he was taken ill during February last.

Dr. Meyer had many friends in the American textile industry whom he frequently assisted in solving their problems. His wide experience and his thorough knowledge were highly appreciated. He possessed the spirit of the true scientist, and his expert opinion was frequently asked and very generally accepted. For years he had served efficiently on various committees of the American Association of Textile Chemists and Colorists.

His own firm loses in him an interested, able and tireless worker, a quiet man of a fine and strong character who will be greatly missed.

• NEW METALLIC SOAP

A new Metallic Soap, known as Metasap 571, for use on fibrous materials, has been announced by the Metasap Chemical Company of Harrison, N. J., chemical manufacturers, a subsidiary of the National Oil Products Co.

Formerly the application of the water repelling properties of Metallic Soaps had been limited because solutions containing even small percentages of metallic soaps were very viscose. It is stated that the new powder is designed to yield high concentrations of aluminum stearate in solvents and oils, in water-thin solutions which can be further diluted with almost any thinner such as toluol, varsol, ethyl acetate, stoddard solvent, etc.

Solutions of Metasap 571 may be brushed or sprayed or the material to be treated may be dipped in the solution with equal effectiveness. Brushed or sprayed on brick, stone, cement, stucco, wallboard, etc., provides excellent waterproofing, as maximum penetration is obtained due to the viscosity of the product, it is claimed. This is also true for use on textiles, paper, and fiberboard. The new product has found use in waterproofing flower boxes and in the preparation of an efficient wall-sealer.

• CORRECTION, CARBIC ADVERTISEMENT

In the Carbic Color & Chemical Co. advertisement which appeared on page XII, October 31st issue, some of the issues were trimmed too closely so that the banner on the end of the train read "20 or more yards a minute." This should have read "120 or more yards a minute."

• WITH A.A.P.

James L. McIntyre, of Guntersville, Ala., is now employed by the American Aniline Products, Inc., in their Charlotte dyestuff laboratory. Mr. McIntyre received a B.S. in Textile Engineering from Alabama Polytechnic Institute last August.

• S.O.C.M.A. MEETING

The regular monthly luncheon meeting of the Synthetic Organic Chemical Manufacturers Association was held at the Chemists' Club, New York City, at noon on October 20, 1938. It was agreed to hold the next meeting on Tuesday, November 15 at the Chemists' Club. It was announced that the 17th Annual Meeting of the Association would be an evening affair and would be held on Tuesday, December 13, at the Chemists' Club.

• GENERAL RELEASE

General Dyestuff Corp., 435 Hudson Street, New York City, has distributed a circular describing the following product:

Benzo Fast Copper Blue F B L—which produces an exceptionally clear, bluish shade on cotton or rayon. This shade is said to be very fast to light and to show a very good fastness to water, salt-water, washing and perspiration. The product is further said to level well and to produce tone-in-tone effects on mixed fibers of cotton and rayon. The shade is easily dischargeable. Circular I.G. 1547.

• L. T. I. ALUMNI MEETING

A meeting of the New York Alumni of the Lowell Textile Institute was held on Wednesday evening, October 26th, 1938, at the Cabin Grill, 35 West 33rd Street, New York City. A business meeting followed dinner at which Adolph Winkler, Textile Consultant, was elected president for the ensuing year. The guest speaker was William Green of the *Daily News Record,* who discussed various new developments ion the textile field and suggested the idea of forums at which current problems of the industry would be discussed by representatives of all branches of the field.

• NATIONAL RELEASE

National Aniline & Chemical Co., 40 Rector Street, New York City, has released a bulletin describing the following product:

National Carbanthrene Direct Black R B Paste—applicable to cotton, rayon or silk, yielding bloomy shades of black said to be of excellent fastness. It is stated that it does not require a hypochlorite after-treatment in order to develop the shade. It is further claimed that this product is readily reducible and is unaffected by metals, therefore being suitable for application in all types of machines. The manufacturer states that it is particularly valuable for pad-jig work because of its excellent dispersion. Bulletin No. 226.

• FOOD COLORS

In preparing the list of coal-tar colors for certification under the requirements of the Food, Drug and Cosmetic Act, the following notice was sent out by W. G. Campbell of the Food and Drug Administration, U. S. D. A., under date of October 6th. Information is given regarding the submitting of samples to be certified. There was also appended a list of colors which had been prepared from information then available. As October 20th was the date set for submitting samples for the first list set up for certification, we shall publish this list as soon as it is available.

UNITED STATES DEPARTMENT OF AGRICULTURE

FOOD AND DRUG ADMINISTRATION

Washington, D. C.

October 6, 1938.

To Manufacturers and Dealers in Coal-Tar Dyes:

In order to complete the preliminary chemical and pharmacological testing of coal-tar colors to be listed for certification under the requirements of the Food, Drug and Cosmetic Act, we have prepared the attached list of colors established from all the information we have been able to obtain so far from manufacturers of dyes, cosmetics and pharmaceuticals. The list contains colors which may be used as oil, water and spirit solubles and as pigments, in addition to those which are fast to acid, alkali and light. Our consultations with representatives of the industries indicate that there are among these all of the coal-tar dyes necessary in obtaining the colors required for foods, drugs and cosmetics.

Our investigations have shown that in some instances dye manufacturers do not distribute their products directly to the food, drug or cosmetic industries. Their output is bought, however, by dealers who in turn distribute the dyes for food, drug or cosmetic use. In other instances, cosmetic dyes are of foreign manufacture distributed by an agency in the United States. Under the certification requirements of the new act, it will be mandatory that none but certified dyes be used after June 25, 1939, and such dyes must be certified by the American manufacturer or by an authorized American agent of a foreign manufacturer. It is imperative that manufacturers and also dealers who are acting as exclusive distributors of coal-tar dyes for food, drug and cosmetic use, submit the samples and information requested below by *October* 20 if the dyes in which they are interested are to be placed on the first list set up for certification.

The present letter supersedes our letter of September 16, 1938. There are ten dyes on the list sent out on that date for which substitutes, for one reason or another, have been included in the present list; therefore samples of the ten dyes which have been superseded need not be submitted. Also, samples of the fifteen dyes which are at present on the list of certified food colors need not be submitted.

The samples of all dyes are to be submitted under the following conditions and accompanied by the following data:

1. The sample should consist of one pound.

2. The color should consist of not less than 82 per cent pure dye.

3. It may be in any one of the following forms:

Free dye
Sodium, potassium or calcium salt
Hydrochloride of sulfate

4. It should be as free as commercially possible from intermediates and impurities.

5. The methods of analysis for the dye, intermediates and impurities should accompany the samples.

6. The names of all intermediates used in the manufacture of the dye should be stated.

7. The structural formula and chemical name of the dye must be given.

8. Any physiological data available concerning the toxicity of the dye should accompany the sample.

9. Any information regarding its use in other countries.

10. In what form the color is used (lake, salts, water solution, alcohol solution, oil solution, etc.), and if you have the information available, please tell us from your experience whether it is light-, acid-, or alkali-fast under the conditions of use; (this information is desired since there are instances where a color is said to be light-, acid-, or alkali-fast, yet under conditions of use in certain cosmetics has proved not to be so. In case you have sent this information previously, you need not repeat it.

11. When salts (acid or alkali), lakes or diluents are used, with which ones in your opinion, based upon your experiences, is each dye suitable for use in foods, drugs or cosmetics?

Please send samples carefully labeled to the Division of Pharmacology, Food and Drug Administration, Washington, D. C., just as soon as possible.

Very truly yours,

W. G. CAMPBELL, *Chief.*

Those dyes which have Colour Index numbers are given with the name and the Colour Index number, and the trade name of those which do not have Colour Index numbers and are not on the present certified list of food colors are given with the names of the manufacturers. It may be possible that some of the colors for which no Colour Index numbers are given are duplicates. This can be determined readily when the information requested has been submitted.

The colors in this list are considered as the free dyes, without reference to their salts (for example, chloride or metallic salt) even though the Colour Index number may be for such a salt. Lists of such radicals as may be permitted for use in the formation of salts of these dyes will be set up later in the regulations.

No.	*C.I. No.*	*Name*
		GREEN
1	662	Brilliant Green Cryst.
2	666	Guinea Green B (Certified).
3	667	Fast Acid Green B.
4	670	Light Green SF Yellowish (Certified).
5	1078	Alizarin Cyanine Green F.
6	None	Fast Green FCF (Certified)
7	None	Alizarin Cyanine Green F (1078 unsulfonated — Zinsser & Co.).
		YELLOW
8	None	Naphthol Yellow S (Certified).
9	22	Oil Yellow AB (Certified).
10	138	Metanil Yellow.
11	61	Oil Yellow OB (Certified).
12	636	Fast Light Yellow.
13	640	Tertrazine (Certified).

14	642	Polar Yellow 5G.
15	766	Fluorescein.
16	800	Quinoline Yellow (spirit-soluble).
17	801	Quinoline Yellow (water-soluble).
18	None	Sunset Yellow (Certified).
19	None	Cosmetic Fanchon Yellow (Harmon Color Works).
		RED
20	30	Fast Acid Magenta B.
21	35	Brilliant Lake Red R.
22	44	Para Red.
23	57	Amidonaphthol Red 6B.
24	73	Sudan II.
25	79	Ponceau 29
26	80	Ponceau 3R (Certified).
27	113	Oil Vermillion (Sudan R).
28	163	Permanent Red 4B Extra Lithol Rubin B).
29	165	Red for Lake C.
30	176	Fas Red A, Extra.
31	184	Amaranth (Certified).
32	189	Lithol Red (Monolite Red R)
33	214	Lake Red D.
34	216	Pigment Scarlet 3B.
35	248	Toney Red (Oil Scarlet).
36	749	Rhodamine B.
37	752	Rhodamine 6G.
38	758	Violamine R.
39	768	Eosine YS (Bromo Acid).
40	772	Erythrosine.
41	773	Erythrosine (Certified).
42	777	Rose Bengale.
43	778	Phloxine B.
44	1027	Alizarin.
45	1034	Alizarin Carmine.
46	1128	Algol Pink R (Vat Pink B).
47	1211	Helindone Pink BN.
48	None	Ponceau SX (Certified).
49	None	Spirit Fast Red M (National Aniline & Chemical Co., Inc.).
50	None	Oil Red O (National Aniline & Chemical Co., Inc.).
51	None	Oil Pink B (National Aniline & Chemical Co., Inc.).
52	None	Dichlorfluorescein (H. Kohnstamm & Co.).
53	None	Alizarin Light Red B (Sandoz Chemical Works, Inc.).
54	None	Alizarin Light Red 4B (Sandoz Chemical Works, Inc.).
55	None	Dibromfluorescein (The Hilton-Davis Chemical Co.).
56	None	Tetrachlorfluorescein (H. Kohnstamm & Co.).
57	None	Camidine Oil Red (H. Kohnstamm & Co.).
		ORANGE
58	23	Sudan G.
59	27	Orange G.
60	150	Orange I (Certified).
61	None	Orange BN (Calco Chemical Co.).
62	None	Cosmetic Fanchon Orange (Harmon Color Works).
63	None	Neo-Orange (Max Factor & Co.).
		BROWN
64	81	Oil Brown D.
65	167	Acid Alizarin Brown B.
66	234	Resorcin Brown.
67	None	Oil Brown M (National Aniline & Chemical Co., Inc.).
68	332	Bismark Brown.
		VIOLET
69	695	Acid Violet 4BN.
70	1073	Alizurol Purple (Alizarin Irisol Violet).
71	None	Alizarin Irasol Violet (1073 unsulfonated—Zinsser & Co.).
72	1080	Anthraquinone Violet B.
73	None	Alizarin Light Violet 2RC—Sandoz Chemical Works, Inc.).
		BLUE
74	671	Alphazurine FG (Patent Carmine Blue AE).
75	714	Brilliant Acid Blue A (Patent Blue A).
76	729	Victoria Blue B.
77	862	Induline (Spirit-Soluble).
78	861	Induline Blue (Water-Soluble).
79	922	Methylene Blue.
80	1054	Alizarin Saphirol.
81	1075	Alizarin Astrol B.
82	1113	Indanthrene Blue CD.
83	1177	Indigo (Synthetic).
84	1180	Indigotine (Certified).
85	None	Alizarin Night Blue AG (Sandoz Chemical Works, Inc.).
86	None	Hexyl Blue (John Campbell & Co.).
87	None	Brilliant Blue FCF (Certified).
88	None	Neo-Blue (Max Factor & Co.).
		BLACK
89	246	Naphthol Blue-Black.
90	307	Coomassie Fast Black B.
91	None	Grasol Fast Black (Geigy Co., Inc.).
92	864	Nigrosine (Spirit-Soluble).
93	865	Nigrosine (Water-Soluble).

CLASSIFIED

POSITION WANTED: Lowell Textile graduate, 3 years dyeing laboratory, color matching and testing, 2 years analytical work and plant chemist (industrial plant). Contact work and sales research experience. Write Box No. 157, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

WANTED: Opening available for young graduate Textile Chemist with five to ten years' experience in practical application of dyestuffs. Knowledge of Spanish or other foreign languages helpful. Willingness to live abroad essential. Full details required first letter. Write Box No. 158, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

WANTED: Manufacturer of a complete line of textile specialties and sulfonated oils has an opening for an experienced salesman with a following among the dyers and finishers in the Metropolitan and Eastern territory. This is an opportunity for the right man. Write Box No. 159, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

WANTED: Position open in Textile Specialty House, Philadelphia vicinity for Chemist with Cotton and Rayon finishing and dyeing experience, preferably one familiar with the make-up and manufacture of oils, softeners, sizes, etc., used in the industry. Good future assured to the proper man. Permanent position. State expected salary in first letter. Write Box No. 160, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

WANTED: A large manufacturer of Sulfonated Oils for the Textile and Tanning Trades desires sales agents who are now calling on these trades to represent it in New England, Chicago, Ill., Pennsylvania, North and South Carolina. Write Box No. 161, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.